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ABSTRACT

This volume contains all research consortium abstracts which were accepted for presentation at the Minneapolis, Minnesota Convention of the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD), April 7-11, 1983. Abstracts represent "state of the art" research encompassing the entire spectrum of AAHPERD disciplines. Abstracts are grouped according to topics (pedagogy, physiology, health, biomechanics and skill acquisition, health, handicapped, motor development, curriculum, history, physiology, measurement and evaluation, sociology, and psychology). Also included are abstracts of poster sessions, which were multidisciplinary in nature and provided greater opportunity for the researcher to share ideas and results. (JD)

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ABSTRACTS

of Research Papers 1983

Marlene J. Adrian, Editor
Washington State University

Presented at the Minneapolis, Minnesota Convention of the
American Alliance for Health,
Physical Education, Recreation and Dance
in the Research Consortium Meetings

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Purposes of the American Alliance For Health, Physical Education, Recreation and Dance

The American Alliance is an educational organization, structured for the purposes of supporting, encouraging, and providing assistance to member groups and their personnel throughout the nation as they seek to initiate, develop, and conduct programs in health, leisure, and movement-related activities for the enrichment of human life.

Alliance objectives include:

1. Professional growth and development – to support, encourage, and provide guidance in the development and conduct of programs in health, leisure, and movement-related activities which are based on the needs, interests, and inherent capacities of the individual in today's society.
2. Communication – to facilitate public and professional understanding and appreciation of the importance and value of health, leisure, and movement-related activities as they contribute toward human well-being.
3. Research – to encourage and facilitate research which will enrich the depth and scope of health, leisure, and movement-related activities; and to disseminate the findings to the profession and other interested and concerned publics.
4. Standards and guidelines – to further the continuous development and evaluation of standards within the profession for personnel and programs in health, leisure, and movement-related activities.
5. Public affairs – to coordinate and administer a planned program of professional, public, and governmental relations that will improve education in areas of health, leisure, and movement-related activities.
6. To conduct such other activities as shall be approved by the Board of Governors and the Alliance Assembly, provided that the Alliance shall not engage in any activity which would be inconsistent with the status of an educational and charitable organization as defined in Section 501(c) (3) of the Internal Revenue Code of 1954 or any successor provision thereto, and none of the said purposes shall at any time be deemed or construed to be purposes other than the public benefit purposes and objectives consistent with such educational and charitable status.

Bylaws, Article III

TABLE OF CONTENTS

	PAGE
Preface	vii
Reviewers	ix
Free Papers: Pedagogy J. Grover Wolf, Madison, Wisconsin	1
Free Papers: Physiology I Stanley Sady, University of Nebraska, Omaha	6
Free Papers: Health I Nancy Struna, University of Maryland, College Park	13
Free Papers: Biomechanics and Skill Acquisition Robert Shapiro, Northern Illinois University, DeKalb	20
Free Papers: Physiology II Jim Morrow, University of Houston, Texas	28
Free Papers: Health II Lorraine Davis, University of Oregon, Eugene	34
Free Papers: Handicapped I John Dunn, Oregon State University, Corvallis	40
Free Papers: Motor Learning Paul Dunham, University of Wyoming, Laramie	48
Poster Session: I Peter Wang, Illinois State University, Normal	56
Poster Session: II Herberta Lundegen, Pennsylvania State University, University Park	66
Poster Session: III John Massengale, Eastern Washington University, Cheney	75
Poster Session: IV Elizabeth Roberts, University of Wisconsin, Madison	85
Free Papers: Motor Development Geoffrey Broadhead, Louisiana State University, Baton Rouge	95
Free Papers: Pedagogy II Carlton Meyers, State University of New York, Buffalo	99

Presider of each session is listed under session title.

PAGE

Free Papers: Handicapped II and Curriculum 103
Gail Dummer, Indiana University, Bloomington

Free Papers: Physiology III 107
Richard Bowers, Bowling Green State University, Ohio

Free Papers: History II 115
Linda Ho, Southern Illinois University, Carbondale

Free Papers: Measurement and Evaluation 120
Ted Baumgarten, University of Georgia, Athens

Free Papers: Physiology IV 126
Patty Freedson, University of Massachusetts, Amherst

Free Papers: Sociology I 132
Deborah Feltz, Michigan State University, East Lansing

Free Papers: Sociology II and Pedagogy III 137
Wendell Liemohn, University of Tennessee, Knoxville

Free Papers: Psychology 144
Linda Bunker, University of Virginia, Charlottesville

Presider of each session is listed under session title.

PREFACE

This volume contains all Research Consortium research abstracts which were accepted for presentation at the Minneapolis, Minnesota Convention of the American Alliance for Health, Physical Education, Recreation and Dance, April 8-11, 1983.

Space was made available at the convention for research free papers and research poster presentations. Approximately 300 research abstracts were received and critically reviewed. The list of over 100 reviewers, with an average of four reviewers per abstract, appears in this volume.

The accepted abstracts represent "state of the art" research encompassing the entire spectrum of AAHPERD disciplines. Thus some sessions are grouped according to topics, others are not. The poster sessions are multi-disciplinary in nature and provide greater opportunity for the researcher to share ideas and results with interested members of AAHPERD than is possible during the free papers sessions.

The abstracts in this volume are grouped according to sessions and presented chronologically as the papers were reported during the convention. Actual presentation dates and times are noted on each abstract. For further information about individual papers, contact the person listed in the lower right-hand corner of the respective abstracts.

In addition to the research free papers and research poster presentations, the Research Consortium sponsored 14 research symposia. Twenty symposia applications were reviewed by a scientific review committee consisting of Research Consortium Fellows and the liaison member from each Alliance organization to the Research Consortium.

Many thanks are accorded those who submitted abstracts (symposia, free paper, and poster) and to the reviewers. The final date for submission of abstracts will be October 15, 1983 for the AAHPERD convention in Anaheim, 1984. Application forms are available now.

Special thanks are given to those who presented their research and to those who presided at the research sessions at this convention. Research is a search for meaning - existing behavior, causes, relationships, truth, and theories. The sharing of research is vital to any profession, but it is vital that persons in one profession be cognizant of research in related professions. Hopefully the program presented in this volume, as well as the Research Consortium Research Symposium, will provide the quality interaction among colleagues

to stimulate thinking and thus facilitate our common pursuit of an enhanced quality of life in the near and more distant future.

Marlene J. Adrian
President-Elect, Research Consortium
Department of Physical Education for Women
Washington State University
Pullman, Washington 99164-1512

The following Research Consortium Fellows reviewed the free communication and poster abstracts:

Abraham, Lawrence D.	University of Texas at Austin
Bain, Linda L.	University of Houston
Baker, John A. W.	Southern Illinois University
Baumgartner, Ted	University of Georgia
Bennett, Bruce L.	Ohio State University
Blair, Steve	University of South Carolina
Boileau, Richard A.	University of Illinois - Urbana
Bowers, Richard W.	Bowling Green State University
Broadhead, Geoffrey	Louisiana State University
Bunker, Linda K.	Rt. 10, Box 47, Charlottesville, VA 22901
Burke, Edmund J.	Springfield College
Campbell, Donald E.	Oregon State University
Clarke, David H.	Indiana University
Clarkson, Priscilla M.	University of Massachusetts
Cox, Richard H.	Kansas State University
Cumbee, Frances Z.	University of Wisconsin
Cureton, Kirk	University of Georgia
Davis, Lorraine G.	University of Oregon
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Disch, Jimmy	Rice University
Dishman, Rod K.	Southwest Missouri State University
Dummer, Gail	University of Indiana
Dunham, Jr., Paul	University of Wyoming
Dunn, John M.	Oregon State University
Evans, Carolyn A.	Mississippi State University - Jackson
Fitt, Sally	University of Utah
Flatten, Kay	Iowa State University
Franks, Don	University of Tennessee
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Freischlag, Jerry	Canisius College
Gallagher, Jere	University of Pittsburgh
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Greendorfer, Susan	University of Illinois-Urbana
Hardin, Don	University of Texas at El Paso
Haywood, Kathleen	University of Missouri-St. Louis
Ho, Linda	Southern Illinois University
Humphrey, Dennis	Southwest Missouri State University
Van Huss, Wayne	Michigan State University
Hutton, Robert S.	University of Washington
Ibrahim, Hilmi	Whittier College
Ismail, A. H.	Purdue University
Jackson, Charles W.	Old Dominion University
Johnson, Birger L.	Fresno State University
Johnson, Dewayne J.	Florida State University
Kamen, Gary	Indiana University
Katch, Frank I.	University of Massachusetts
Kneer, Marian E.	University of Illinois-Chicago
Krotee, March L.	University of Minnesota
Landers, Daniel M.	Arizona State University
Leimohn, Wendell	University of Tennessee
Lindquist, Edith L.	4414 Thousand Oaks Dr., San Jose, CA

Lofthus, Geraldine Klimovitch	74 Monroe St., Honeoye Falls, NY
Lucas, John	University Park, PA
Lundegren, Herberta M.	Pennsylvania State University
Maksud, Michael	Oregon State University
Massengale, John	Eastern Washington University
McLaughlin, Tom	Auburn University
Meyers, Carlton R.	SUNYAB, Buffalo, NY
Milesis, Chris A.	Health Central, University Hospital, Augusta, GA
Miller, Kenneth D.	Florida State University
Morris, Alfred F.	University of Illinois-Champaign
Morris, Harold H.	Indiana University - Bloomington
Morrow, Jr., James R.	University of Houston
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Noble, Larry	Kansas State University
Olson, Arne L.	East Stroudsburg State
Ostrow, Andrew C.	West Virginia University
Park, Roberta	University of California-Berkeley
Powell, Frank M.	Furman University
Powers, Scott K.	Louisiana State University
Rosentswieg, Joel	Texas Woman's University
Rothstein, Anne	24 Taunton Lake Drive, Newtown, CT
Roundy, Elmo	Bringham Young University
Sady, Stanley, P.	University of Nebraska-Omaha
Serfass, Robert C.	University of Minnesota
Sinning, Wayne E.	Kent State University
Smoll, Frank L.	University of Washington
Spirduso, Waneen Wyrick	University of Texas-Austin
Straub, William F.	Ithaca College
Struna, Nancy L.	University of Maryland
Thomas, Jerry R.	Louisiana State University
Thomas, Luke E.	Austin Peay State University
Vaccaro, Paul	University of Maryland
Wade, M. G.	Southern Illinois University-Carbondale
Wang, Peter Y.	Illinois State University
Williams, Melvin H.	Old Dominion University
Wrisberg, Craig A.	University of Tennessee
Cooper, John	Indiana University - Bloomington

The following AAHPERD members assisted Research Consortium Fellows with the review of selected abstracts:

Anson, Ken	University of Washington
Denson, Dan	Louisiana State University-Baton Rouge
Silverman, Steve	Louisiana State University

A COMPARATIVE EVALUATION OF THREE RELAXATION TRAINING PROCEDURES.

Jeffrey E. Brandon, Ph.D., University of New Orleans.

The main purposes of this investigation were: (a) to determine the overall effectiveness of three relaxation training procedures; (b) to determine which technique was the most effective in reducing dependent measures of tension representative of behavioral, physiological, and cognitive domains; and (c) to determine the extent of correlation between the dependent measures. The three relaxation training procedures employed were: Behavioral Relaxation Training, Meditation, and a Seashore Sounds "Attention Focusing" method. The latter method was designed to serve as a placebo treatment to control for expectation and other nonspecific effects. The four dependent measures selected for study were: The Behavioral Relaxation Scale, Electromyographic level of the frontalis muscle, Skin Conductance Level, and Self-Report of Tension. The sample consisted of 33 undergraduate students at Southern Illinois University who were enrolled in Healthful Living classes during the spring semester, 1982. Six females and 5 males were randomly assigned to each of the three relaxation training groups. The general protocol for each training group consisted of a pretest measurement, six training sessions, a post-training measurement, and, four weeks later, a follow-up measurement. Training for each subject was completed in a week to ten days. Statistical analyses revealed that all three training groups experienced significant reductions on two dependent measures--Electromyographic level and Self-Report, yet only the Behavioral Relaxation Training group produced significant reductions on the Behavioral Relaxation Scale. Thus, there were reductions on physiological (EMG only), cognitive, and behavioral measures for the Behavioral Relaxation Training group. However, no significant correlation was observed among any of the dependent measures.

Jeffrey E. Brandon, Ph.D.
Dept. of Health & Physical Education
University of New Orleans
New Orleans, LA 70148

Friday, April 8
9:00 - 9:15 a.m.

AN EXPERIMENTAL ANALYSIS OF THE LOCATION BEHAVIORS OF DANCE TEACHERS.

This research describes the development and application of a computer-assisted tracking system for recording and analyzing the location patterns and preferences of dance teachers. The research assumes that where a teacher teaches affects how he or she teaches and ultimately, how effectively he or she interacts with students. The methodology was designed to fill the need for precise, objective measures of the dance teacher's position in space and time. The subjects were 20 teachers of ballet and modern dance who were additionally sub-grouped by sex and experience. The instrumentation consisted of 1) recording components (video camera with ultrawider lens, video cassette recorder, 19" monitor, and playback options), 2) coding components (location cell matrix, electronic keyboard, audio tape recorder and playback tape deck, and a signal conditioning circuit), 3) computer components (Harris 6025/5 computer, transcription software, syntax analyzer, and file storage) 4) output components (printer, plotter, and terminal display). Videotapes were made of each subjects's location behaviors while they taught class. Each tape was subsequently coded using the electronic keyboard and a 25 cell matrix. The data was then transcribed, timed, and organized by a computer program (Plexyn)- a complex analyzer which draws on user defined values of the coding properties to verify, complete, and uniformly format the entries in the observer's record for later statistical analysis. The findings showed comparative measures per cell of incident and duration for the 3 dependent variables (sex, experience, style). A variance formula was used to compare location heterogeneity and mean and total distances from the source of sound accompaniment were calculated and compared. Finally actual location pathways were plotted and compared for density and skewness. The results of this research demonstrated that a technically advanced methodology exists to quantify human location patterns, specifically those of teachers. The tables showed that ballet teachers are slightly less mobile than modern dance teachers. Male teachers tended to occupy cells more often than female teachers, and experienced teachers showed a smaller mean distance from the source of sound than inexperienced teachers. This research will provide opportunities to investigate other important location orientation relationships that occur in instructional situations and to relate this information to teaching strategies and teacher effectiveness.

Judith A. Gray, Ph.D.
Dept. of Physical Education & Dance
University of Wisconsin
Madison, WI 53706

Friday, April 8
9:30 - 9:45 a.m.

EFFECTS OF INSTRUCTION AND SUPERVISION IN INTERACTION ANALYSIS ON THE TEACHING BEHAVIORS EXHIBITED BY ELEMENTARY PHYSICAL EDUCATORS TOWARD DISRUPTIVE CHILDREN. MaryBeth Steffan, Shaker H.S., N.Y.; Victor H. Mancini and Deborah A. Wuest, Ithaca College.

The purpose of this investigation was to determine the effects of instruction and supervision in interaction analysis (IA) on the teaching behaviors exhibited by selected elementary physical educators toward disruptive children. Four teachers were randomly assigned to treatment and control groups ($n_t = n_c = 2$). Each teacher was asked to identify three disruptive children in a selected class. Teacher behavior toward the whole class was identified through the use of Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS). Teacher behavior exhibited toward the three disruptive children in each class was identified through the use of the Dyadic Adaptation of CAFIAS (DAC). A modified case study design was employed. Each teacher was observed for 12 days. The 12 classes were divided into three phases: Phase I (three classes) for baseline (pretest) data collection, Phase II (six classes) for application of treatment, and Phase III (three classes) for posttest data collection. During Phase II, while viewing videotapes of their teaching, the control group received conventional supervisory feedback relating to the class as a whole as well as to their interactions with the disruptive children. The treatment group, while viewing their videotapes, received instruction, supervision, and feedback in CAFIAS and DAC which described their interactions with the whole class and with the disruptive children. Descriptive statistics were used to determine whether differences in teaching behavior, as identified by the 17 CAFIAS and 9 DAC variables, existed between the two groups with respect to their interactions with the whole class and the behaviors exhibited toward the disruptive children. The control group exhibited only slight differences in their behaviors toward the whole class. The treatment group exhibited distinct differences in their interactions with the whole class and with the disruptive children. With the disruptive children, these teachers exhibited more praise and acceptance of students' actions and ideas, asked more questions, provided more information, and allowed more student interpretive behavior than previously. The teachers in the control group were more restrictive in their behaviors, utilizing more directions and criticisms in their interactions with disruptive children. It appears that instruction and supervision in CAFIAS and in DAC had a positive effect not only on the behaviors the teachers exhibited toward the whole class but on their interactions with disruptive children.

MaryBeth Steffan
Shaker High School
Latham, NY

Friday, April 8
9:45 - 10:00 a.m.

DIFFERENCES IN INTERACTIVE DECISIONMAKING BETWEEN EXPERIENCED AND INEXPERIENCED TEACHERS. David C. Griffey, Lynn Housner & Bernard Oliver, The University of Texas at Austin.

Research on teacher thinking has provided considerable insight into the decisionmaking processes that teachers employ as they interact with students. The available research indicates that teachers become involved in decisionmaking only when the plan is perceived as going poorly and that teachers only consider a few courses of action in these situations (Clark & Yinger, 1979; Joyce, 1978, 1979; MacKay, 1977). Although the available research on teacher thought has added substantially to our understanding of classroom instruction, there is no published data available that describes the thought processes employed by physical education teachers. Given the open and dynamic nature of instruction in the gymnasium, it might be expected that the decisionmaking strategies employed by physical educators would be very different from those that characterize classroom teachers. The present study was designed to describe the differences in interactive decisionmaking between experienced and inexperienced physical education teachers. Ten elementary physical education teachers with five years or more teaching experience and ten elementary teachers in training served as subjects. Each teacher was videotaped as they taught two 24-minute lessons on soccer and basketball dribbling to four children ranging in age from 7 to 9 years. After teaching each lesson the teachers participated in a stimulated recall session similar to that employed by Peterson and Clark (1978) in order to determine the cues that teachers attended to and the nature of the interactive decisions implemented. The results of the study showed substantial differences in interactive decisionmaking of experienced and inexperienced teachers. Experienced teachers sought out cues that provided information about student enjoyment, student engagement, student ability and clarity of instruction. Inexperienced teachers, however, focused their attention on the time requirements of various activities and the management of students. In addition, experienced teachers considered more alternatives during instruction and had more alternative courses of action stored in memory than inexperienced teachers. In terms of the implementation of alternative strategies, both groups of teachers included individuals who changed and did not change their lessons. In contrast to past research, changes did not take place only when the lesson was perceived as going poorly. There were a number of examples where teachers adjusted their lessons even though the lessons were perceived by them as going well. The results of the study are discussed in terms of their implications for educating beginning teachers.

Lynn Housner, Physical Education
The University of Texas
Austin, TX 78712

Friday, April 8
10:00 - 10:15 a.m.

THE IMPACT OF MODELING WITH REHEARSAL ON KNOWLEDGE, ATTITUDES, AND FREQUENCY OF PRACTICE RELATED TO BREAST SELF-EXAMINATION.

Phillip J. Marty, Ph.D., University of Arkansas; Robert J. McDermott, Ph.D., Southern Illinois University.

For breast self-examination (BSE) to be an effective early detection technique for breast cancer, individuals must be aware of both the benefit of the procedure and the need for regular practice. The purpose of this study was to test the impact of modeling with rehearsal on participant knowledge, attitudes, and subsequent frequency of breast self-examination. The sample for this study consisted of 180 college-aged women who were randomly assigned to one of two groups and exposed to: 1) pamphlets addressing breast disease and BSE (comparison group); or 2) a facilitator conducted program using modeling with rehearsal (experimental group). A posttest only comparison group design was utilized. At completion of the treatments, subjects responded to a knowledge and attitudes inventory. At three months, a questionnaire was mailed to all subjects requesting information on breast self-examination practice. To assess differences on knowledge scores, ANOVA was applied. Chi square was used to detect differences among attitudes and on BSE practice at three months. Results indicated no difference on knowledge scores, however significant differences did occur among selected attitudes. At three-month follow-up, 60.5% of the experimental group indicated practicing BSE at least once since exposure to the educational program, while only 39.5% of the comparison group reported such practice. Statistical analysis further indicated that the number of times in which BSE was performed during the three-month interval was significantly more frequent in the experimental group than the comparison group ($p = .0309$). Conclusions of this study indicated that modeling with rehearsal is an effective intervention that improves the frequency and enhances the benefits of BSE practice.

Phillip J. Marty, Ph.D.
Health Education Program
University of Arkansas
Fayetteville, AR 72701

Friday, April 8
10:15 - 10:30 a.m.

S-T SEGMENT CHANGES DURING MONITORED BICYCLE ERGOMETER EXERTION FOLLOWING VARIED CARBOHYDRATE FEEDING AND VITAMIN B-6 SUPPLEMENTATION.

A. Siemann, J.E. Leklem, D.E.Campbell, Human Performance Lab, Oregon State University, Corvallis, OR 97331.

The purpose of this study was to monitor coronary responses occurring in the S-T segment of an electrocardiogram before, during, and after exercise following a "standard" carbohydrate-loading schedule with varied vitamin B-6 supplementation. The study was conducted using four college-aged males who had been training a minimum of two years prior to the onset of the study with sport cycling as the primary mode of physical conditioning. The study design followed a plan of three one-week courses of fixed dietary intake accompanied by two monitored exercise sessions each week. The intensity of the exercise was determined by target heart rates of sixty, eighty, and ninety percent of age-adjusted values. The duration of the exercise was thirty minutes at 60% THR, twenty minutes at 80% THR, and five minutes at 90% THR. ECG tracings were taken each minute of the exercise. The first week consisted of a normal balanced diet as suggested by U.S. RDA standards; the second week consisted of a carbohydrate loading schedule with normal vitamin B-6 supplementation (2mg)--three days of a depletion phase followed by a three-day loading phase; and the third week consisted of a carbohydrate-loading schedule with increased vitamin B-6 supplementation (8mg). Using standardized "Z" values for the criterion measure, the results indicated:

1. heart rates remained constant throughout the six testing sessions
2. the work loads attained for the heart rate controlled intensities increased significantly during the carbohydrate loading phases and decreased significantly during the carbohydrate depletion phases
3. the S-T segment was abbreviated significantly during the depletion phase at all THR intensities and was abbreviated significantly during the loading phase at THR intensity of 90%.

The conclusion was drawn that the external work output can be increased through a carbohydrate-loading dietary schedule at all three target heart rate intensities but the cost of the increased work appears to be an abbreviated S-T segment. When intensity of the exercise approached maximal values, coronary responses, as demonstrated by the S-T segment, contraindicated healthy performance.

Arthur Siemann
Department of Physical Education
Oregon State University
Corvallis, OR 97331

Friday, April 8
10:45 - 11:00 a.m.

THE EFFECT OF EXERCISE DURATION ON THE FEED INTAKE AND BODY COMPOSITION OF MALE ALBINO SWISS MICE. R. Bulbulian and K. Gruenwald. Depts. Physical Education and Foods and Nutrition, Kansas State University.

The purpose of this study was to examine the long-term training effects of aerobic training of varying daily duration on body composition, weight, and food intake of mature Swiss albino mice. Male Swiss albino mice (n=54) were equally divided into a control group and five exercise groups (n=9) of 20, 30, 60, 120, and 240 minutes exercise duration daily. All animals were similarly handled and were exercised on a treadmill at 0.27 mph. Feed intake and body weight were monitored weekly during a 10-week exercise training period. At the completion of the study the mice were sacrificed and the animal carcasses were chemically analyzed for fat and protein content. The results of this study demonstrate no differences in body weight between groups ($p<0.97$) with all groups gaining approximately 4.5 - 5.8 grams during the 10-week period. Protein content showed an unexpected rising trend from 13.0% to 14.6% with increased duration of exercise ($p<.05$). Conversely, fat content decreased from 15.7% to 12.0% in the control to the 4-hour exercise groups respectively ($p<.05$). Feed intake showed a non-significant drop during the 20-min exercise treatment, but rose linearly ($r=.96$) thereafter along a relatively flat regression slope ($s=.105$). These data show a slight but variable appetite supressing effect of light exercise in mice accompanied by favorable body composition changes, even in the absence of differences in body weight. The findings also support, in part, the work of Mayer (1954) in rats, but do not support decreases in body weight subsequent to limited exercise periods of light intensity.

Ronald Bulbulian
Dept. of Health, P.E., & Recreation
Kansas State University
Manhattan, KS 66506

Friday, April 8
11:00 - 11:15 a.m.

BETA-ENDORPHIN LEVELS FOLLOWING LOCAL MUSCULAR FATIGUE.
Priscilla M. Clarkson, Anthony M. Melchionda, James Graves, University of Massachusetts; Charles W. Denko, Case Western Reserve University and Fairview General Hospital, Cleveland, Ohio.

Beta-endorphin levels were assessed from blood samples taken prior to and immediately following an isometric knee extension exercise regimen in 14 untrained college age subjects (7 males and 7 females) and 5 elite whitewater paddlers (1 male and 4 females). The exercise consisted of three work bouts separated by three minutes rest; each bout consisted of 16 maximal isometric contractions of 10 seconds duration with 5 seconds inter-trial rest. Beta-endorphin immunoreactivity was assessed using a radioimmunoassay technique (New England Nuclear). Despite a 34.0% loss in muscle strength, no significant increase in Beta-endorphin levels were found. Pre and post Beta-endorphin levels were $\bar{x}$ = 72.0 pg/ml (SD = 24.6) and $\bar{x}$ = 67.0 pg/ml (SD = 9.2) for the paddlers, and $\bar{x}$ = 63.6 pg/ml (SD = 13.4) and $\bar{x}$ = 60.9 pg/ml (SD = 22.5) for the untrained group. It is interesting to note that two paddlers who demonstrated relatively large increases in Beta-endorphin levels in the present study (24 pg/ml and 16 pg/ml), also showed high increases (relative to other subjects) following a maximal treadmill exercise (57 pg/ml and 32 pg/ml, respectively) in a previous study. Other studies have reported that bicycle and treadmill exercise results in a rise in Beta-endorphin levels. The biological significance of this rise is considered to be related to a pain control mechanism. In the present study knee extension isometric exercise induced a sizable strength loss and subjective reporting of pain. However, no increases in Beta-endorphin levels were found perhaps suggesting that other factors may be involved in pain modulation during local muscular fatigue.

Priscilla M. Clarkson
Department of Exercise Science
University of Massachusetts
Amherst, MA 01003

Friday, April 8
11:15 - 11:30 a.m.

CHANGES IN ANTHROPOMETRIC AND BODY COMPOSITION MEASUREMENTS WITH INCREMENTAL WEIGHT LOSS PRODUCED BY EXERCISE AND CALORIC RESTRICTION. Marjorie A. King and Frank I. Katch, Department of Exercise Science, University of Massachusetts, Amherst, MA.

Twenty-three initially obese, middle aged women (25-51 years, $\bar{x}$ weight = 74.4 kg., SD = 7.9; $\bar{x}$ % body fat = 37.2, SD = 4.1) participated in a 4-month training program of thrice weekly exercise and calorically restricted food intake. The one-hour exercise sessions involved calisthenics and progressive intensity walk-jog. A computer based nutrition plan (FITCOMP) that considered age, level of physical activity, and body size was used to generate daily meal plans based on individual food selections. Anthropometric (fatfolds, girths) and body composition (hydrostatic weighing) measurements were made at each 5 lb. weight loss. All subjects lost 5 lbs. with 10 subjects losing 10 lbs., and 7 subjects losing 20 lbs. There were no decreases in any anthropometric or body composition measures for a control group (N = 7). With 5 lb. weight loss, there were significant reductions in % body fat, waist, thigh, and biceps girths. With 10 lb. weight loss, significant decreases occurred for triceps, iliac, and thigh fatfolds, and umbilicus and buttocks girths. Percent fat decreased from 38.3% to 34.3% with a non-significant change in lean body weight. With 20 lb. weight loss, there were significant decrements in 5 fatfolds and 12 girths. Percent fat decreased 8.6% (37.2% to 28.6%) with no decrease in lean weight. The ratios of trunk (chest, abdomen, buttocks) to extremity (forearm, biceps, thigh, calf) regional girth measures at each increment of weight loss were 1.35 (5 lbs.), 3.5 (10 lbs.) and 2.7 (20 lbs.). The present study demonstrates that the exercise and dietary regimen significantly reduces anthropometric and body composition measurements and spares lean body weight.

Marjorie A. King
Department of Exercise Science
University of Massachusetts
Amherst, MA 01003

Friday, April 8
11:30 - 11:45 a.m.

RATINGS OF PERCEIVED EXERTION AT ANAEROBIC THRESHOLD IN MALES AND FEMALES. Kevin M. Bellew, Edmund J. Burke and Barbara E. Jensen, Springfield College, Springfield, MA.

The purpose of this study was to determine the reliability and the consistency of ratings of perceived exertion at anaerobic threshold (RPE_{AT}) in college-age males and females. Eleven males, X age = 22.72 $\pm$ 2.24 years and 11 females, X age = 21.36 $\pm$ 2.53 years participated in the study. Each subject participated in 2 continuous graded treadmill tests of $\dot{V}O_2$ max within a one-week time interval. During these tests anaerobic threshold (AT) was determined based upon three criteria: (1) a non-linear increase in $\dot{V}_E$ (2) an increase in F_EO_2 without a decrease in F_ECO_2 and (3) an increase in V_E/VO_2 without an increase in $\dot{V}_E/\dot{V}CO_2$. Perceived exertion (RPE) was monitored at each workload. Physiological and psychophysiological parameters ellicited on Days 1 and 2, respectively were as follows: for males, $\bar{X}$ $\dot{V}O_2$ max = 54.90 $\pm$ 5.93 and 54.46 $\pm$ 5.38 ml/kg·min^{-1}, X RPE_{AT} = 13.91 $\pm$ 1.50 and 13.27 $\pm$ 1.86; for females, X $\dot{V}O_2$ max = 46.30 $\pm$ 5.28 and 44.95 $\pm$ 7.67 ml/kg·min^{-1}, $\bar{X}$ RPE_{AT} = 12.63 $\pm$ 1.49 and 12.09 $\pm$ 1.92. Reliability was assessed utilizing intraclass correlation coefficients. RPE_{AT} was found to be highly reliable for males, R = .989, for females, R = .930 and across subjects, R = .974. The presence of significant differences across test days and sex was tested utilizing a 2X2 ANOVA with repeated measures for test days. No significant differences ($p > .05$) were found for test days, sex or for their interaction. It was concluded that RPE_{AT} is a reliable and consistent parameter. The data suggest that RPE may be used as a practical means of assessing AT which in turn may be used as one of the criteria for training intensity.

Kevin M. Bellew
235 West End Avenue
Massapequa, NY 11758

Friday, April 8
11:45 - 12:00 p.m.

RATINGS OF PERCEIVED EXERTION, ERGOMETER SPECIFICITY AND SEX DIFFERENCES AS FUNCTIONS OF WORK INTENSITY. Marcia L. Collins, Edmund J. Burke and Barbara E. Jensen, Movement Sciences Department, Springfield College, Springfield, MA 01109.

The purpose of this study was to investigate the presence of ergometer specificity in ratings of perceived exertion (RPE) as measures of work intensity in males and females. Thirteen male and 13 female college-age volunteers were administered discontinuous graded tests of $\dot{V}O_2$ max on a bicycle ergometer and a treadmill within a one week period with a separation of at least 48 hours between tests. During each test $\dot{V}O_2$ was measured by the Douglas bag method during the last minute of each workload and RPE was elicited with the use of the Borg 15 point scale. At the conclusion of each testing day each subject had scores from one maximal and 3-5 submaximal workloads. Each submaximum workload was assigned a value relative to the percent of $\dot{V}O_2$ max it elicited. These % $\dot{V}O_2$ max scores were then arbitrarily classified as those which elicited RPE ratings of 9-11, 12-13, 14-15 and 16-18. This permitted direct comparisons between ergometers and sexes for the percentages of $\dot{V}O_2$ max elicited at each of the 4 RPE levels. The data were analyzed through a 2 x 2 x 4 analysis of variance with repeated measures on the ergometry factor. The three main effects of sex at two levels, ergometer at two levels and ratings of perceived exertion at four levels and all of the interactions of these three independent variables were examined for the dependent variable of % $\dot{V}O_2$ max. As expected there was a significant ($p < .05$) difference for the four levels of RPE. The X VO_2 max values elicited for the 4 RPE levels were 65.08, 75.17, 85.97 and 93.68 percent, respectively. On the bicycle there were significant differences between the sexes such that all RPE levels were elicited as significantly ($p < .05$) higher levels of % $\dot{V}O_2$ max. For treadmill work, however, there was no significant difference ($p > .05$) between the sexes in % $\dot{V}O_2$ max at each RPE level. Due to a significant ($p < .05$) interaction between ergometer and sex, it was found that at lower work intensities (55 to 79% of $\dot{V}O_2$ max) RPE values from 9-13 occurred at higher percentages of $\dot{V}O_2$ max on the treadmill as opposed to the bicycle. At the higher work intensities RPE values were elicited at similar percentages of VO_2 max on the bicycle and treadmill. The data suggest both ergometer and sex specificity in the use of RPE as a measure of work intensity.

Marcia Collins
1841 Roxbury Road
Columbus, OH 43212

Friday, April 8
12:00 - 12:15 p.m.

RELATIONSHIP OF PERCEIVED EXERTION AND HEART RATE RESPONSE DURING EXERCISE TESTING IN WHEELCHAIR USERS.

T. Birk, Riverside Hospital; S. Gavron, Bowling Green State Univ; J. Ross, K. Hackett, K. Boullard, R. Olson, and R. Gosling, Toledo Society for the Handicapped.

The purpose of this study was to determine the relationship between rate of perceived exertion(RPE) and heart rate(HR) response during submaximal and maximal arm work of wheelchair users(WCU). Twenty-three, ($\bar{x}$= 26 yrs. of age) lower body neuromuscular impaired wheel chair users were tested on a Monark bicycle ergometer which was modified for arm cranking. The majority of the WCU were sedentary before the testing began based on responses from an activity questionnaire. None of the WCU were on heart rate blunting medications. Each WCU received an explanation of the Borg RPE scale before testing began. During the test, each WCU was asked every minute and at termination for a rating of the total sensation of effort and not to focus on one specific discomfort. A single ECG lead(V_5) was continuously monitored during the test and recorded simultaneously with the RPE. A r=.83 was found to exist between RPE and HR. The most frequently indicated RPE's and corresponding HR's are as follows:

BORG SCALE		HEART RATE(per minute) ($\bar{x}$)	(+SD)
Very Light	9	105	9.5
	10	116	5.2
Fairly Light	11	139	3.1
	12	141	10.1
Somewhat Hard	13	143	8.4
	14	155	6
Hard	15	162	8.3
	16	171	5.2
Very Hard	17	180	7.8

Comparative data for RPE-HR relationships during arm work are lacking. Unlike previous leg work studies, the HR is generally higher for a given RPE. This may be partially explained by a reduced sensation of effort due to the frequent use of the arms to propel the wheelchair. Also, the high correlation suggests that HR can be estimated from RPE with reasonable accuracy, for WCU performing similar exercise tasks.

Thomas J. Birk, Ph.D.
The Center for Health Prom.
Riverside Hospital
Toledo, OH 43604

Friday, April 8
12:15 - 12:30 p.m.

DECISION MAKING SKILLS UTILIZED IN RESISTANCE TO PERSUASION AMONG SIXTH GRADE STUDENTS. Michael J. Hammes, Marshall W. Kreuter, Gregory M. Christenson, and Gary D. Nelson, University of Utah, Salt Lake City, Utah.

The purpose of the study was to determine whether sixth grade students trained in resistance to persuasion skills, could identify those skills subsequent to viewing a videotaped scenario where child actors were responding to group pressure to smoke. A randomized post-test only control group design was used in the study. Five classrooms with 144 subjects were assigned to the experimental group and four classrooms with 85 subjects were assigned to the control group. Participating teachers in the study received inservice training in the underlying theory in resistance to persuasion, as well as instruction in how to teach resistance to persuasion skills. Social and behavioral science research indicates that resistance to persuasion may be enhanced by the use of any of the following techniques: idiosyncratic credits, recruiting an ally, and delaying a decision. All subjects in the experimental group received a minimum of 3 hours of instruction in the use of resistance to persuasion skills. A significant Mantel Haenzel summary chi-square of 16.84 and a p-value of .00004 was gererated from the data. Subjects in the experimental group were able to discriminate specific resistance to persuasion skills at significantly higher frequency than subjects in the control group. These findings strongly suggest that resistance to persuasion skills, skills designed to reduce peer interference in the decision making process, can be taught and successfully learned in a school health education setting. While the results from this study represented responses to a smoking situation, it is possible that these skills might be generalized and used in other peer pressure circumstances.

Michael Hammes, Ph.D.
Division of H.P.E.R.
Eastern Montana College
Billings, MT 59101

Friday, April 8
1:15 - 1:30 p.m.

A COMPARATIVE STUDY OF RURAL-URBAN ELDERLY CONCERNING THEIR LIFE SATISFACTION, SELF-CONCEPT AND PERCEIVED HEALTH STATUS.

Teresa Griffin, Cleveland State University.

The purpose of this research was to compare elderly residents living in rural and urban areas concerning their life satisfaction, self-concept and perceived health status. The sample consisted of 271 elderly with 194 residing in urban environments and 77 living in rural areas of Knox County, Tennessee. Ages ranged from 65 to 95 years old. Data collection employed the use of the Tennessee Self Concept Scale, the Life Satisfaction Z Index and a perceived health scale. Sixty-five census tracts in Knox County were used to obtain the stratified proportional sample. Statistical analyses of the data involved the use of the Chi-Square and Mann Whitney U. When examining the life satisfaction of the subjects, findings indicated there were no differences in rural and urban elderly. Life Satisfaction is a measurement of how happy one seems to be. The self-concept scale used in the study explored ten variables: overall self-esteem, self-criticism, identity, self-satisfaction, behavior, physical self, moral-ethical self, personal self, family self, and the social self. The analyses of these data indicated no differences in the rural and urban elderly except for the variable, physical self. The physical self variable indicates how an individual views his/her body, state of health and physical appearance. When looking at the perceived health status, analysis of data also indicated no difference in rural and urban elderly residents.

Dr. Teresa Griffin, Dept. of HPER
Cleveland State University
Cleveland, OH 44115

Friday, April 8
1:30 - 1:45 p.m.

AN ASSESSMENT OF HEALTH STATUS ON URBAN PUBLIC SCHOOL TEACHERS.

Thomas Golaszewski, Mike Milstein, Robert Klick, and Roderick Duquette, State University of New York at Buffalo.

To date, no extensive evaluation exists in the literature describing the health status of school teachers. As part of the "Teacher Stress Intervention Project," an evaluation of health status of a sample of Buffalo Public School Teachers was undertaken in the Fall of 1982. Seventy-three (K-8) teachers completed all evaluations including: blood pressure, total cholesterol, cholesterol to HDL ratios, and a self report computerized health appraisal identifying 35 health and demographic variables.

Major results included: males = 15, females = 58; excessive weight = 13.3 lbs./person (m = 25.8, f = 10.1); 29 smokers (23%) averaged 19 cigarettes/day; systolic blood pressure averaged 121 (m = 129.3, f = 119.0); diastolic blood pressure averaged 78.8 (m = 86.7, f = 76.8); total cholesterol = 215.6 (m = 215.0, f = 215.8); chol/HDL ratio = 4.3 (m = 4.6, f = 4.3); presence of diabetes = 22% (m = 33%, f = 19%); tendency towards Type A behavior = 77% (m = 53.3%, f = 82.8%); age = 38.6 (m = 38.5, f = 38.7); appraised health age = 36.2 (m = 34.6, f = 36.6); achievable age = 32.3 (m = 30.0, f = 33.0); health age improvement potential = 3.8 (m = 4.9, f = 3.6).

Though the health appraisal analysis generally reported positive results (appraised health age below actual age), certain key parameters are particularily disturbing as a group, i.e., weight, cholesterol, chol/HDL ratio, presence of diabetes, and the tendency toward Type A behavior.

With a worker population age and apparent levels of occupational stress increasing, the implications for future teacher health problems appear significant. The evidence presented suggests a need to develop health promotion programs for teachers which parallel the efforts taking place for workers in the private sector.

Thomas Golaszewski, Ed.D.
Dept. of Health Education Professions
SUNY @ Buffalo
Buffalo, NY 14214

Friday, April 8
1:45 - 2:00 p.m.

INCIDENCE OF THE BINGING AND PURGING SYNDROME WITHIN A COLLEGE ENVIRONMENT. Jo Carter and Jane Eason, Louisiana State University.

A compulsion to maintain a thin body while living in a society obsessed with food often results in a bizarre eating disorder which is seemingly affecting the lives of many college women. Bulimarexia has been defined as a syndrome which is manifested by binging on food and then purging either by forced vomiting, fasting, laxatives, or any combination of these. The purpose of this study was (1) to identify a group of college women who binge and then purge themselves by self-induced vomiting, and (2) to compare specific characteristics of these women to women who do not show signs of the eating disorder. Data were collected on 93 females who were members of four social sororities at a large southern university. The subjects voluntarily completed in privacy a personal data form and a questionnaire concerning their participation in selected purging behaviors, and health behaviors. Because of the secret nature of the cyclic eating disorder, complete anonymity was assured all subjects. Thirty-two women or 34% of the sample identified themselves as self-induced vomiters. A Kruskal-Wallis test was used to determine if responses to the individual statements differed for the self-induced vomiters and the nonvomiters. Analysis of data also included the reporting of percentages for the two groups on all demographic items. The F ratios calculated using the Kruskal-Wallis test of ranks indicated that the subjects who use self-induced vomiting for weight control differed considerably from those who do not on a variety of attitudes and feelings. Most strikingly, the vomiters when compared to the nonvomiters have a stronger feeling that others dominate them, were less trusting of others, were less concerned about overall health, felt more strongly that their impulses were difficult to control, admitted a desire to change their personality and were less willing to seek psychological treatment if it were needed. Sociodemographic characterisitcs for the two groups were similar. It was concluded that the noticeable differences between the two groups suggest a different group of young women in our society today who are predisposed to the binging and purging syndrome.

Jane Eason
School of HPERD, La. State Univ.
Baton Rouge, LA 70803

Friday, April 8
2:00 - 2:15 p.m.

THE USE OF AN ANTI-INFLAMMATORY AGENT IN THE MANAGEMENT OF DYSMENORRHEA.* Marjorie Albohm, Sports Medicine and Joint Reconstructive Surgery, Indianapolis; S. Kay Burrus, Indiana University; Connie Pumpelly, Liberty Baptist College.

This study was conducted to determine if ingesting an anti-inflammatory drug at the onset of dysmenorrhea would eliminate or decrease symptoms. The 20 subjects were female intercollegiate athletes (16), athletic trainers (2), and coaches (2) between the ages of 18 and 31 years of age who suffered from primary dysmenorrhea. Only women not taking other medication were accepted. Each subject completed a pre-questionnaire, monthly questionnaire and a post study questionnaire concerning the severity of her dysmenorrhea and menstrual cycle. Ten of the subjects were studied through two menstrual cycles and ten subjects during four menstrual cycles. Eighteen of the twenty subjects reported a decrease in menstrual pain and fewer activity limitations as a result of taking the anti-inflammatory agent. Nineteen subjects reported a decrease in pain with thirteen reporting total elimination of the pain. All subjects gave a positive response when asked about the continued use of Naprosyn or another anti-inflammatory drug for the treatment of dysmenorrhea. It appears that groups of drugs called prostaglandin-inhibitors, taken at the onset of the menstrual pain, relieve the painful symptoms of menstruation by slowing down the production of chemicals called prostaglandins. The results of this study strongly suggest that Naprosyn and like anti-inflammatory drugs should be one of the first treatments considered for administration to athletes who complain of primary dysmenorrhea.

*Appreciation to the School of H.P.E.R. for a grant partially supporting this study is acknowledged.

S. Kay Burrus
Dept. of Physical Education
Indiana University
Bloomington, IN 47405

Friday, April 8
2:15 - 2:30 p.m.

AN ASSESSMENT OF COGNITIVE, AFFECTIVE, AND BEHAVIORAL DENTAL HEALTH COMPETENCIES IN MULTI-CULTURAL SCHOOL CHILDREN. Fred L. Peterson, Ph.D., Dept. of Physical and Health Education, University of Texas at Austin.

PURPOSE: The major purpose of this study was to examine the status of Dental Health competencies in a multi-cultural sample of elementary school children. A secondary purpose was to determine if significant relationships existed between independent variables such as age, sex, ethnicity and dependent variables such as dental knowledge, attitudes, locus of control, and behavior. PROCEDURES: A survey questionnaire of items measuring dental knowledge, attitudes, locus of control, and self-reported dental behavior was administered to 880 public school students in grades four & six. A pilot study was performed to establish readability, reliability, and validity of the different scales. The survey instrument was refined after item analysis, and then implemented in the experimental stage of the study. Statistical analysis of the data consisted of Reliability Analysis, Item Analysis, Pearson Product Correlation, and Analysis of Covariance. FINDINGS: There were significant differences in dental knowledge due to age and race, dental attitudes due to age and sex, and locus of control due to age and race. There were no significant differences observed in dental behavior. School children in this sample demonstrated moderately high levels of dental health cognitive, affective, and behavioral competencies. Low to moderate associations were identified between dental knowledge, attitudes, and behavior. CONCLUSIONS: Dental disease is the most common disease process known to humans. The universal prevalence of dental disease is a constant reminder of the need for effective dental health education that aims at prevention. Dental Health education curricula need to be designed to foster optimal changes in dental knowledge, dental attitudes, and dental behavior. The results of this study suggest the need for designing dental health education interventions that are sequential in nature, and are tailored to the varied socio-cultural backgrounds of school children. This information would be useful for health educators involved in curriculum planning and program evaluation.

Fred L. Peterson, Ph.D.
Dept. of Physical & Health Educ.
University of Texas at Austin
Austin, TX 78712

Friday, April 8
2:30 - 2:45 p.m.

RELIGIOSITY AND SATISFACTION WITH SEXUAL STATUS AMONG COLLEGE MALES AND FEMALES. Michael Young, University of Arkansas.

The purpose of the study was to determine (1) the degree to which college males and females are satisfied with their sexual status, and (2) whether students classified according to satisfaction with sexual status could be distinguished on the basis of religiosity. Previous studies have investigated the role of religiosity relative to attitudes toward and participation in selected types of sexual behavior. Measures of sexual behavior have varied, but in a number of studies the focus has been on initiation of sexual activity (virgin - non-virgin). Satisfaction with sexual status (i.e., satisfaction with being a virgin or a non-virgin) has largely been ignored. The results of this study should be of value to health educators, student personnel workers, and others who may deal with students in a counseling situation. Students in required freshman level courses at a major southern university voluntarily completed a sexual behavior inventory and the Faulkner and De Jong Religiosity Scale. Only responses from single, never married students were included in the study. This resulted in 496 questionnaires available for analysis. Based upon their responses to the sexual behavior inventory, students were classified into one of four sexual status satisfaction groups: (1) satisfied virgin, (2) frustrated virgin, (3) satisfied non-virgin, (4) regretful non-virgin. Data were analyzed utilizing Wilks' Lambda discriminant analysis. Religiosity items and related data served as a single set of independent variables. Results of the discriminant analysis yielded two significant discriminant functions indicating that as a set, the items selected by the stepwise procedure did distinguish among students classed according to satisfaction with sexual status. Significant univariate F ratios were noted for selected religiosity variables, sex (gender), sexual situation, and sexual class. Results of the study indicate that students differing in satisfaction with sexual status can be distinguished on the basis of religiosity and other selected variables. These factors should be given consideration in the development of educational and counseling programs.

Michael Young, Ph.D.
Health Education Program
University of Arkansas
Fayetteville, AR 72701

Friday, April 8
2:45 - 3:00 p.m.

A BIOMECHANICAL COMPARISON OF THE GRAB START AND THE TRACK START IN COMPETITIVE SWIMMING. Richard J. LaRue, Bradford College, MA.

The purpose of this study was to analyze and compare the differences in reaction time, movement time, response time, flight time, completion time, horizontal impulse, horizontal force and attained horizontal velocity as measured through a biomechanical analysis of the grab start and the track start in competitive swimming. On April 10, 1980, 20 female subjects (collegiate swimmers from the Springfield College Women's Swimming Team) began training and were exposed to the fundamentals of both the grab start and the track start, with the aid of a specially prepared videotape presentation and through videotape feedback. On April 16, 1980, three judges viewed a selection videotape of 19 subjects and determined that all 19 subjects were ready to be tested. Beginning April 17, 1980, 18 subjects were filmed and timed performing both the grab and track starts. Each subject performed 10 starts in a random order with the restriction that there be five grab starts and five track starts completed per subject. A repeated measures correlated t test was computed for the test means of each of the dependent variables: reaction time, movement time-response time, flight time, completion time, horizontal impulse, horizontal force and attained horizontal velocity. The flight time and completion time means for the 18 subjects performing the track start in competitive swimming were significantly less (faster) than the flight time and completion time means for the same subjects performing the grab start, at the .05 level of significance. The means for the other six dependent variables: reaction time, movement time, response time, horizontal impulse, horizontal force and attained horizontal velocity, were not significantly different at the .05 level of significance. It should be noted that a key aspect of this investigation was the modification of an existing starting block, to allow for support of the rear leg in the track start. From the results of this study it could be inferred that the track start is faster than the grab start. The investigator feels that the findings of this study needed only to show a non-significant difference ($p > .05$) in the eight dependent variables comparted statistically, to indicate significant potential for the track start as a new competitive starting technique.

Richard J. LaRue
Bradford College
Bradford, MA 01830

Friday, April 8
3:15 - 3:30 p.m.

Electromyographical analysis of the isometric phase preceding concentric contraction. Mark D. Grabiner, University of Southern California; Rick N. Robertson, University of Illinois.

The purpose of this investigation was to assess the relationship between the magnitude of the IEMG during the motor reaction time, referred to as the level of muscular activation, and various movement indices related to the concentric isotonic condition following the motor reaction time. A unique contribution of the study was the concurrent quantification of the isometric and isotonic states of a single muscular contraction. Movement time for a 45^{o} unrestricted elbow extension in a horizontal plane and the associated acceleration characteristics were the performance criteria of interest. The premovement and movement parameters were collected on-line using electromyography, electrogoniometry, and accelerometry. Fifteen male volunteer subjects participated and performed the criterion task from three initial elbow angles (120, 100, and 80^{o} from full extension) and in four categories of movement time based upon and normalized across each subject's minimal time (maximal effort). The level of activation demonstrated stronger relationships to movement parameters than did the duration of the motor reaction time suggesting contemporary views that the duration of the motor reaction time is "incomplete as a criterion measure" (Lagasse, 1979) are accurate. Regression analysis yielded prediction equations which accounted for 53 and 65 percent of the variance associated with movement time and one of the acceleration measures, respectively, using the level of activation and the duration of motor reaction time as independent variables. Results indicate the need for further in-depth study, including simultaneous quantification of all involved agonists. Such investigation will help to ellucidate both the biomechanical aspects of movement and the nature of the specification and control of movement. It was concluded as a result of this study that the quantification of the level of activation is a more meaningful biological variable than the temporal quantification of the motor reaction time- an historically prevalent practice.

Mark D. Grabiner
PED 107: Physical Education Dept.
University of Southern California
Los Angeles, CA

Friday, April 8
3:30 - 3:45 p.m.

THE EFFECTS OF STICK LENGTH ON THE KINEMATICS OF MAXIMAL VELOCITY THROWING IN LACROSSE. John Stevenson, Oakland University.

The purpose of this study was to determine, through the use of three dimensional cinematographical analysis, the effects of lacrosse stick shaft lengths of 29, 39, 49, and 59 inches on the performance of a maximal velocity lacrosse throw with respect to selected kinematic variables. Subjects for this study were 11 lacrosse players from The Johns Hopkins University. Subjects were filmed in two orthogonal planes using two high-speed 16-mm cameras in order to provide X and Y coordinate data in two dimensions. Each subject performed one trial each using an overhand and sidearm throwing style and also four throwing trials with each selected shaft length. A computer program was written to calculate X, Y, and Z coordinates from the X and Y coordinate data from the two cameras through the use of vectors. Nineteen kinematic variables from key positions during the throw were selected for analysis. These data were extracted from the film records through the use of standard cinematographical techniques. The data were then analyzed using appropriate statistical procedures in order to determine: 1) the reliability of the throwing arcs, 2) the difference in ball release velocity between the overhand and sidearm throwing styles, 3) the difference in ball release velocity among the selected shaft lengths, and 4) relationships among the selected variables among the subjects. The results of this study included the following: 1) throwing arcs of the subjects were consistent across trials, 2) no significant difference was found for ball release velocity between the two throwing styles and among the four selected shaft lengths, and 3) several significant ($p \leq .05$) relationships among selected kinematic variables among subjects were found. From the results of this study it was concluded that both throwing style and stick shaft length do not affect the velocity of the ball at release during a maximal velocity lacrosse throw and, in addition, any kinematic differences which exist in the performance of maximal velocity throwing in lacrosse are due to factors other than throwing style and shaft length of the lacrosse stick.

Dr. John R. Stevenson
Dept. of Physical Education
Oakland University
Rochester, MI 48063

Friday, April 8
3:45 - 4:00 p.m.

VARIABILITY OF PERFORMANCE OF SKILLED PUNTERS IN FOOTBALL. Nancy L. Pike, University of Houston.

The purpose of this study was to investigate the kinematic and kinetic differences in the performance of skilled football punters that lead to variability in the distance they kick the ball. The subjects employed in the study consisted of four male college students. Two of the male students were punters on their collegiate football teams. The other two subjects had experience competitively kicking in high school. Each subject was filmed executing four punts, while attired in shorts and shoes. Anthropometric measures of the thigh, lower leg and foot were employed as input to Hanavan's model in order to obtain the body segment parameters of each subject's kicking leg. In addition to filming the subjects, the horizontal distance each football was punted was also measured. Differences in the kinetic energies of the thigh, lower leg and foot of the kicking leg were found. These differences were primarily due to variability in the punter's linear velocities of approach and body positions just prior to ball contact. The results of this study suggest that punters in football in addition to building strength and flexibility in their leg muscles must attend to the speed of their approach and their body position, especially trunk lean, just prior to ball contact. As the leg was brought closer to the horizontal at ball contact due to body position, a greater percentage of the hip, knee and ankle muscular torques had to be used to overcome the moments due to the respective segmental body weights. Thus, the angular velocities of the segments were significantly reduced even though the joints muscular torques remained nearly constant.

Nancy L. Pike
HPER Department
University of Houston
Houston, TX 77004

Friday, April 8
4:00 - 4:15 p.m.

ISOKINETIC LEG STRENGTH OF ELITE ADOLESCENT FEMALE TRACK AND FIELD ATHLETES BY EVENT. Terry Housh, William Thorland, Gerald Tharp; University of Nebraska-Lincoln, Lincoln, Nebraska.

The purpose of this study was to investigate strength differences in the leg flexors and extensors of elite adolescent ($\bar{x}$ = 16.39 + 1.62 yrs) female track and field athletes. The subjects (n = 62) were scholarship participants at an Olympic development camp. Participants were divided into four events, throwers (n = 16), jumpers (n = 11), distance runners (> 400 m) (n = 12), and sprinters (≤ 400 m) (n = 23). Peak torques were measured in the dominant leg by a Cybex II isokinetic dynamometer at 180 °/sec. One-way ANOVA contrasts were used to compare the peak torques between events for both flexion and extension. Omnibus f statistics indicated significant differences ($p < .05$) between events for both flexion and extension. Scheffe' post hoc evaluations indicated that for flexion movements distance runners ($\bar{x}$=50.91 + 13.43 ft/lbs) and sprinters ($\bar{x}$=52.96 + 13.86 ft/lbs) differed significantly from throwers ($\bar{x}$ =69.94 + 14.73 ft/lbs) while no other comparisons were significant. For extension movements distance runners ($\bar{x}$ = 63.31 + 13.11 ft/lbs), jumpers ($\bar{x}$ = 80.30 + 10.79 ft/lbs), and sprinters ($\bar{x}$ = 73.14 + 15.62 ft/lbs) differed significantly from throwers ($\bar{x}$ = 99.21 + 17.37 ft/lbs). No other comparisons were significant. Generally elite adolescent female throwers tend to be stronger than distance runners, jumpers, and sprinters in flexion and extension movements. However competitors other than throwers are similar in strength for both flexion and extension movements involving moderate speeds of contraction.

Terry Housh
School of HPER
UN-L
Lincoln, NE 68588-0138

Friday, April 8
4:15 - 4:30 p.m.

EFFECTS OF TEST PROTOCOL ON PERFORMANCE OF BEGINNING LEVEL PLAYERS ON SELECTED TENNIS SKILL TESTS. Larry D. Hensley and Leanne M. Kinch, University of Northern Iowa.

The use of skill tests represents one method of measuring achievement of psychomotor skills. Tennis, in particular, is one sport in which skill testing has been commonly utilized. Numerous tennis skill tests, utilizing slightly different administrative procedures, abound in the literature. Some of these tests require that the ball be thrown to the student in order to permit a return shot, others specify that the ball be hit to the student, and a few tests utilize some type of ball-projection machine. The purpose of this study was to investigate the effect that the method of ball projection had on the performance scores on selected tennis skill tests. Fifty-nine students enrolled in beginning level tennis classes at the college level served as subjects. Each subject was administered two versions of the Hewitt Forehand and Backhand Drive Tests, one in which the ball was thrown to the subject and the second in which the ball was hit to the subject. The order of testing was counterbalanced to eliminate any order effect that might occur. All tests were administered by three trained testers on consecutive days at the end of the semester course. The results of a repeated measures ANOVA revealed no significant effect of projection method on forehand drive performance, $F(1,58) = .80$, $P > .05$, or on backhand drive performance, $F(1,58) = .16$, $P > .05$. Although males, on the average, scored higher than females on each of the tennis skill tests, within group performance on the two versions of the selected skill tests did not differ as a function of sex. In order to examine whether the method of testing would produce a different effect across skill levels, similar analyses were conducted within the top one-third and bottom one-third of the students. For each group, there was no significant difference in the test scores obtained when the ball was thrown or when it was hit. The results of this study suggested that performance on tennis skill tests was not effected by the method of projecting the ball to the student. This finding was consistent regardless of sex or skill level of the student. Therefore, it seems reasonable to conclude that tennis skill tests which purport to measure stroking ability may utilize a protocol in which the balls are either thrown or hit to the student without having a differential effect on performance.

Larry D. Hensley
School of HPER, West Gymnasium
University of Northern Iowa
Cedar Falls, IA 50614

Friday, April 8
4:30 - 4:45 p.m.

THE EFFECTIVENESS OF THE CRAWL STROKE AND BREAST STROKE SEQUENCES IN TEACHING BEGINNING SWIMMING.

Charles F. Cicciarella, University of North Carolina at Greensboro.

The purpose of this study was to compare the effectiveness of two different sequences of skills used in the teaching of swimming to non-swimmers. The experimental sequence was a series of skills leading to the breast stroke as the first recognized swimming stroke to be learned whereas the control sequence was a series of skills leading to the crawl stroke. A total of 131 subjects initially unable to swim 25 yards were given instruction in classes ranging in size from 10 to 18 students. Sixty eight subjects (31 males and 37 females) were taught using the experimental sequence and 63 (33 males and 30 females) were taught using the control sequence. Controls were instituted for student absences. During the tenth lesson of approximately 60 minutes subjects were tested for maximum floating time, maximum swimming distance, time for 50 and 100 yards, and the number of arm stroke cycles required to swim 25 yards. Data from classes with different instructors was pooled as a control for instructor differences. Data was subjected to an analysis of covariance with sequence of instruction and sex of the subject as categorical variables and age of the subject as the covariate. Analysis of the data indicated that the experimental sequence was statistically superior to the control sequence as measured by maximum swimming distance ($p < .01$), maximum floating time ($p < .01$), and time required to swim 50 yards ($p < .05$). The experimental sequence also appeared to be superior for the time required to swim 100 yards and the arm stroke cycles per 25 yards but significance could not be determined as very few subjects from the control group were able to swim the distances required to obtain data for these measures. The sex of the subject was a significant ($p < .05$) factor favoring females only for the maximum floating time measure. The age of the subject was not found to be a significant factor in learning to swim and no interaction among variables was detected.

Charles F. Cicciarella
School of HPERD
UNC-Greensboro
Greensboro, NC 27412

Friday, April 8
4:45 - 5:00 p.m.

THE EFFECT OF MANUAL MANIPULATION ON THE ACQUISITION OF THREE SELECTED TUMBLING SKILLS AS A FUNCTION OF AGE. Frederick C. Surgent, Frostburg State College.

The purpose of this study was to compare the effectiveness of a manual manipulation method of guidance to a controlled spot method on the acquisition of three basic tumbling skills (kip-up, headspring, and handspring) as a function of age. More specifically, this study was designed to determine which age group(s) benefit most from manual manipulation, at what stage of skill acquisition this method is best applied, and if task complexity is a factor in technique selection. The use of the manual manipulation method in teaching these basic skills was intended to enhance skill acquisition. In order to test the acceptability of the hypotheses three groups of subjects, ages 7-10, 12-15, and 18-21 were identified. Subjects in the first two age groups were selected from the Frostburg Community Recreation Program and the third age group from Frostburg State College. Subjects were assigned to either the MM method or CS method and task according to their position in line prior to data collection. Prior to data collection, subjects were pre-tested for purposes of eliminating subjects who could already perform any one of these three tasks. Once assigned to either the MM group or CS group and task, subjects were sent to separate gymnasiums where they were given a total of seventeen trials to perform that task. Five of these seventeen trials, one, five, nine, thirteen, and seventeen were test trials. Two raters were used to judge each of these test trials to determine the amount of skill acquisition taking place. The scores on each of these test trials were subsequently used in the analysis of the study's data. The results of this investigation showed all main effects, (method, age, task and test trials) to be significant and the interaction effects task by age and test by age to also be significant. The statistical results of this study led to the following conclusions concerning this investigation. (1) The MM method proved to be superior to the CS method across all age groups for all tasks in this investigation. (2) While the predicted elementary school age children did not show superior performance scores for skill acquisition on the three tasks, the 18-21 age group did. (3) In terms of ease of skill acquisition, the headspring task proved superior to the kip-up and handspring tasks. (4) It was demonstrated that all tasks were acquired over trials.

Frederick C. Surgent
Department of HPER
Frostburg State College
Frostburg, MD 21532

Friday, April 8
5:00 - 5:15 p.m.

THE EFFECTS OF AEROBIC DANCING AND WALKING ON THE CARDIOVASCULAR AND MUSCULAR SYSTEMS OF POSTMENOPAUSAL FEMALES.

Mary Kay White, Rachel Yeater, R. Bruce Martin, Beth Rosenberg. West Virginia University.

The effects of a six-month, 4-day a week aerobic dancing program on the cardiovascular and muscular systems of postmenopausal women were examined. Comparisons were made with a similar group of women engaged in a walking program. Subjects consisted of 43 women, aged 50 - 63 years, randomly assigned to each group. A modified Balke treadmill test to a heart rate of 145 beats per minute was used to assess changes in cardiovascular fitness with training. Results indicated that both forms of exercise were equally effective in increasing the efficiency of the cardiovascular systems of the women. Both groups demonstrated significant increases in treadmill time (17%,$p<.01$ and 19%,$p<.01$ respectively), while showing significant decreases in resting heart rate, rate-pressure products and recovery heart rates. The magnitude of the changes were quite similar between the two groups. A cable tensiometer was used to evaluate muscular strength changes with aerobic training. Specificity of training was reflected in the results, in that the members of the walking group significantly improved ankle plantar flexion strength (17%,p .001) while the members of the dancing group improved elbow flexion strength (6%,p .05). Both groups significantly gained strength in knee extension (walkers 14%,p .001, dancers 8%,p .05). In conclusion, both forms of aerobic training result in significant and very similar cardiovascular and muscular adaptations in postmenopausal women.

Mary Kay White, Ed.D.
111 White Avenue
Fairmont, WV 26554

Saturday, April 9
9:00 - 9:15 a.m.

CARDIORESPIRATORY AND METABOLIC RESPONSES TO PREGNANCY, JOGGING, AND SWIMMING. Robert O. Ruhling, Joyce C. Foster, Richard W. Latin, and Stephen C. Johnson, Human Performance Research Laboratory, The University of Utah, Salt Lake City, UT.

Recently, several case studies suggested that jogging through pregnancy (P) can be accomplished without serious complications. Several researchers have also described the effects of regular swimming on the health status of the pregnant woman & her unborn child. Recently, we have had the opportunity to measure the fitness level of a woman through 2 consecutive P. The purpose of this study was to compare the physiological effects of jogging through a P to swimming through a P. S was 36 yr old in 1980 (51.7 kg) when she jogged ($6.0\ km \cdot d^{-1}$, $6\text{-}7\ d \cdot wk^{-1}$) through her entire P (JP), & she was 38 yr old (39 at delivery) in 1982 (54.4 kg) when she jogged through her 1st trimester, & completed her P swimming $1.0\ km \cdot d^{-1}$, $6\ d \cdot wk^{-1}$ (SP). These were her 7th & 8th uncomplicated P. Her exercise history through the first 6 P included regular walking & swimming. She began to run 2 yr prior to JP, & started up again 4 wk after delivery. This routine was uninterrupted until the beginning of the 4th month of SP at which time the jogging appeared to be too strenuous for her, & she decided to swim daily. We were able to stress test her at the end of each trimester during both JP & SP using a treadmill protocol ($4.8\ km \cdot hr^{-1}$ with a 1% increase each min) until her HR approached $150\ b \cdot min^{-1}$. Fetal heart tones (FHT) were also measured. The results appear in the table.

Mo	P	Wt (kg)	VE (L/min)	VO2 (ml/kg/min)	O2 Pulse (ml/b)	FHT rest	FHT recovery
3	JP	59.0	55.0	29.8	11.9	-	-
3	SP	61.7	65.1	29.2	12.2	-	-
6	JP	62.1	56.3	29.0	12.2	140	140
6	SP	62.3	66.2	31.2	13.1	140	133
9	JP	63.7	55.8	29.4	12.6	135	140
9	SP	63.5	55.4	25.1	10.6	130	141
p change		>0.1	>0.1	>0.1	>0.1	>0.1	>0.1

We conclude that the data suggest that in the face of increasing weight gains (+23.2%, JP; +16.7%, SP) during pregnancy, aerobic fitness levels may be maintained with no apparent adverse effects occurring to either mother or infant.

Supported in part by NIH Biomed Res Support Grant No.RR07092.

Robert O. Ruhling, Director
Human Performance Research Lab
U of Utah, Salt Lake City, UT 84112

Saturday, April 9
9:15 - 9:30 a.m.

The Effects of a Sauna on Obese and Normal Weight Men. Donald G. Scherrer, C. Eric Gronbech and David Dohmann, CSU.

The purpose of this investigation is to determine changes in body temperature, heart rate, blood pressure, and body weight as a result of a 10-minute sauna at 175° F and a relative humidity of 42%. Comparisons were made between the responses of a group of 8 men of normal body fat (mean = 19.7% ± 3.1%) and 8 men who were over-fat (mean = 19.7% ± 3.3%). The age of the men of normal body fat was M = 32.9 ± 4.4 years, and 37.1 ± 5.5 years for those who were over-fat. Body fat was determined by the measuring skin folds from 6 different areas as outlined by Brozek. Results indicate that body temperature rose significantly ($p < .01$) for the entire group after just 2 minutes in the sauna, but there was no significant difference between the obese and normal fat men. There were no further significant increases in temperature. Increases in heart rate were significant ($p < .01$) when recorded every 2 minutes, for the entire group but there were no significant differences between groups. However, mean heart rates of the over-fat group were consistantly higher at each 2-minute interval during the 10-minute sauna. Blood pressure was taken before the sauna and at the 2,6, and 10-minute points during the sauna. Mean systolic blood pressure rose with each time interval for both groups but there was no significant increase. This was due to the highly varied responses, where in some individuals blood pressure increased dramatically, while in others blood pressure rose initially and then decreased. In addition, mean systolic blood pressures between the 2 groups were not significantly different. Diastolic blood pressure did not significantly increase throughout the sauna for the entire sample, but it was found that at the 6 and 10-minute point diastolic blood pressure was significantly higher ($p < .01$) in the over-fat group as compared to the normal fat group. No significant difference in weight loss between groups was observed, however a significant mean weight loss ($p < .01$) of .29 kg ± .083, was observed for the entire sample. In summary, it must be noted that physiological responses to a sauna are highly individualized. The only difference between the normal fat and over-fat groups is that the diastolic pressure in the later stages of the sauna were significantly higher in the over-fat group. Since heart rate and blood pressure rose sharply in some individuals it may be concluded that saunas may possibly be a physical stress for the cardiovascular system. Only one individual experienced P.V.C.'s during the sauna, and they were isolated.

David Dohmann
Chicago State University G-222
95th Street at King Drive
Chicago, IL 60628

Saturday, April 9
9:30 - 9:45 a.m.

.30

PREDICTION OF EXERCISE-INDUCED ASTHMA BY EXERCISE SYMPTOMATOLOGY. Noble, B.J., Kraemer, W.J. and Robertson, K.; Department of Physical Education, University of Wyoming.

The present research was designed to determine the relationship between selected exercise symptoms and subsequent severity of post-exercise bronchoconstriction. Bronchoconstriction, referred to as exercise-induced asthma, was measured by the change in forced expiratory volume in 1 sec ($FEV_{1.0}$) from resting conditions. Exercise symptoms were sub-divided into three categories: ratings of perceived exertion (Borg Scale); breathing symptoms (N-7); and, two questions recommended by the American Lung Association (ALA), i.e., Are you breathing too fast? Is your heart beating too fast? The breathing symptoms were evaluated on a 5 point scale and consisted of shortness of breath, breathing difficulty, chest congestion, chest tightness, chest discomfort, coughing and wheezing. Twenty-three asthmatic children, sensitive to exercise, were recruited as subjects (N = 15 males; N = 8 females). Subject ages ranged from 10 to 18 years. $FEV_{1.0}$ was measured at rest and at 0, 5, 10 and 15 min of recovery. Exercise consisted of 3 ten-minute workloads represented 30, 50 and 70% of age-related maximum heart rate. Exercise symptom data were collected during the 10th min. Data were analyzed utilizing simple regression, multiple regression and chi square. At the 30% workload, 4 breathing symptoms contributed significantly to the multiple r (0.61) with the greatest variance accounted for by chest congestion (r = 0.58). RPE significantly predicted $FEV_{1.0}$. Likewise, the chi square which evaluated the response (Yes/No) to the ALA question concerning heart rate indicated that S's correctly identified the presence of bronchoconstriction in individual subjects. All 7 breathing symptoms contributed significantly to the multiple r (0.64) at the 50% workload. Again, chest congestion (r = 0.55) accounted for most of the variance in $FEV_{1.0}$. Neither RPE nor the 2 ALA questions were significant predictors. At the 70% workload, wheezing (r = 0.67) accounted for the greatest variance in the multiple r (0.83) with all seven breathing symptoms contributing. RPE was not significantly related to $FEV_{1.0}$ but both ALA questions showed significant chi squares. Breathing symptoms appear to be the most consistent predictors of bronchoconstriction at all workloads (r^2=38%, 41% and 68%, respectively), however, other unmeasured factors require additional investigation. Teaching asthmatic children to monitor breathing symptoms may be an effective method of regulating exercise intensity and, therefore, bronchoconstriction. Supported by a grant from the American Lung Association of Wyoming.

Bruce J. Noble
Department of Physical Education
University of Wyoming
Laramie, WY 82071

Saturday, April 9
9:45 - 10:00 a.m.

MILD STEADY STATE EXERCISE DURING HEMODIALYSIS. Edmund J. Burke, Springfield College; Michael J. Germain, Gregory L. Braden and John P. Fitzgibbons, Baystate Medical Center, Renal Section, Springfield, MA.

During hemodialysis approximately 220 ml of the patient's blood is in the extra-corporeal circuit at any given time. This blood is passed through a dialyzer where diffusion and fluid removal results in significant changes in the composition of the blood. These changes include: (1) fluid removal (2) alterations in serum electrolytes and (3) decreases in uremic toxins. Several hemodynamic factors which might preclude physical exercise performance during hemodialysis include: (1) a fall in total peripheral vascular resistance (2) a decreased cardiac output (3) a decreased left ventricular filling pressure and (4) a fall in blood pressure. Therefore, the purpose of this study was to determine (1) the feasibility and (2) the physiological effects of mild steady state exercise during hemodialysis. Three males X age = 39 years and 3 females X age = 40.3 years on chronic hemodialysis treatment participated in the study. Sitting in a reclining dialysis chair, during the fourth hour of hemodialysis treatment, each subject pedalled a Monark bicycle ergometer at 150 kg.m.min^{-1} for 5 min. Heart rate, blood pressure, pH, HCO_3^- and respiratory gases were measured. All measures were taken while on hemodialysis: just prior to exercise, during exercise and during minutes 5, 15, 30 and 60 of recovery. Exercise HR was $\bar{X}$ = 120.9 beats/min; recovery to pre-exercise levels, $\bar{X}$ = 85.3, was attained within 15 min. Blood pressure changed from pre-exercise levels of $\bar{X}$ = 144.3/89 to exercise levels of $\bar{X}$ = 181.7/94.9; recovery to pre-exercise levels was attained within 4 min. There were no significant ($p > .05$) changes in pre-exercise blood pH, $\bar{X}$ = 7.32 or in pre-exercise serum HCO_3^-, X = 17.5 meq.-1. $\dot{V}O_2$ significantly increased from pre-exercise levels of $\bar{X}$ = .24 1.min^{-1} to exercise levels of X = .52 1.min^{-1}; recovery to pre-exercise levels was accomplished within 4 min. $\dot{V}_E$ significantly increased from pre-exercise levels of 9.2 1.min^{-1} to exercise levels of 18.7 1.min^{-1}; recovery to pre-exercise levels was accomplished within 4 min. Based upon these data it is concluded that the physiological responses to mild steady state exercise during hemodialysis are normal. It appears that further investigation is warranted into the value of using exercise during hemodialysis as a means of training.

Edmund J. Burke, Ph.D.
Springfield College
Springfield, MA 01109

Saturday, April 9
10:00 - 10:15 a.m.

INDIVIDUAL DIFFERENCES IN RELATIVE ENDURANCE AND PHYSIOLOGICAL RESPONSES: PREPUBESCENT, ADOLESCENT AND ADULT COMPARISONS.

Stanley Sady, Kris Berg, Marge Sailors, University of Nebraska-Omaha; Victor Katch, and John Villanacci, University of Michigan.

In the present study we examine the extent of individual differences (ID) in relative endurance exercise performance and physiological responses in adolescent boys (ADOLE, N=22, mean ± SD age = 14.8 ± 1.08 years). T= se data are compared to our previous data of prepubescent (PRE) and adult (ADULT) males (Sady and Datch, RQES 52:246, 1981) to gain insight on the pattern of ID in exercise and physiological responses with increasing age. All subjects were tested twice (test and retest) on a bicycle ergometer at an initial supramaximum power output of theoretically 105% of $\dot{V}O_2$ max (as determined from an incremental maximum bicycle test). Subjects attempted to maintain the initial power output for the entire 8 minutes of the test. Standard open circuit techniques were used to decermine $\dot{V}O_2$ and HR was monitored via a bipolar ECG. The relative endurance scores and their corresponding ID statistics did not differ among the males of different ages. There were no group differences in the total revolutions turned or the total % dropoff from the initial rate (Group effect for Group X Day REANOVA, $p > .05$). High reliability of total revolution scores was found for each group, $r = .84$, $r = .89$ and $r = .82$ for the PRE, ADOLE, and ADULT, respectively. High stability of ID in minute-by-minute RPM was found for all groups (average test-retest for 8 minutes of exercise, $r = .69$ PRE, $r = .70$ ADOLE, $r = .76$ ADULT). The pattern of physiological ID responses differed among groups. For HR, the PRE exhibited the greatest within-individual variation (Si), especially from minute 5 on (F test for variances, $p < .05$). On the average, a greater proportion of the total variability in HR was due to Si compared to "true" ID variation (St) for the PRE (47%) than either the ADOLE (13%) or the ADULT (11%). For $\dot{V}O_2$ a trend of increasing ID as exercise progressed was found for all groups. However, the pattern of $\dot{V}O_2$ differed for the ADOLE compared to the other groups, resembling the PRE during the first half of the test and the ADULT during the latter portion. On the average, the ADOLE had the lowest proportion of total variability due to Si (ADOLE 9%, ADULT 16%, PRE 26%). Although the present study is cross-sectional with its inherent limitations, the data support our earlier hypothesis of a threshold age/maturity effect on the pattern of ID for HR and $\dot{V}O_2$ during relative endurance exercise.

Saturday, April 9
10:15 - 10:30 a.m.

Stanley P. Sady, Ph.D.
School of HPER
University of Nebraska at Omaha
Omaha, NE 68182-0216

A TELEPHONE SURVEY OF COMMUNITY ATTITUDES TOWARD SEX EDUCATION. Mary Seidensticker, Washington Co. EOA, Fayetteville, Arkansas; Michael Young, University of Arkansas.

The purpose of this study was twofold:(1) to determine the acceptability of school sex education programs to residents of northwest Arkansas and (2) to identify factors related to an individual's acceptance or non-acceptance of such programs. Arkansas is a conservative state and has few schools teaching sex education. At the same time the state has an extremely high incidence of problems associated with adolescent sexuality. Thus, such a study was deemed particularly appropriate for our area. Data were collected by means of a telephone survey. Pages from the telephone directory (Fayetteville, Springdale and surrounding areas) were selected by the use of random numbers. Every twelfth residential number on a page was called. The interviewer talked to whoever answered the phone, briefly explained the study and requested their participation. Less than 10 percent of the persons called declined participation because of the nature of the study. Data were analyzed for 119 subjects ranging in age from 15 to 96. The SPSS subprogram "Crosstabs" was utilized to analyze the data in a series of contingency tables. Results indicated that 74.6 percent of the respondents favored school programs of sex education, 20.3 percent of the respondents were against such programs and 5.1 percent were undecided. Significant ($p<.05$) relationships were found between respondents' stance on sex education programs and age, religous affiliation, frequency of church attendence, whether or not they talked to their children about sex and whether or not they talked to their children about contraceptive use. There was no significant relationship between an individual s stance on sex education and variables such as sex, marital status, number of children or age of children. The authors wish to acknowledge the assistance of Bill Bradbury and Melody Ricks in conducting the study.

Mary Seidensticker, Washington Co.
Economic Opportunity Agency
2325 N. Gregg, Fayetteville, AR 72701

Saturday, April 9
10:45 - 11:00 a.m.

Sex Education Program Outcomes: Student and Alumni Perceptions.

Daniel Klein, Ph.D., Northern Illinois University, DeKalb, IL;
Philip Belcastro, Ph.D., Robert Gold, Dr. Ph., Southern
Illinois University, Carbondale, IL.

In 1979, the Bureau of Health Education, Center for Disease Control, published a report which 1) identified the important outcomes in sex education and 2) identified 20 exemplary public school sex education programs in this country. The purpose of this study was to compare program outcome perceptions of students and alumni from two of the identified schools. A 69-item instrument was developed and pilot-tested. Utilizing Cronbach's alpha reliability for the student instrument was .88 while reliability for the alumni instrument was .91. Instruments focused on 33 program outcomes with respect to student changes in; knowledge, understanding of self, values, interaction skills, fear of sex-related activities, and self esteem. The sample consisted of 138 students who completed the sex education course during the 1980-1981 year, and 87 alumni who completed the course in either 1977, 1978, or 1979. A mail survey with one follow-up was utilized to survey alumni while students were surveyed in school. Analysis of variance was used to determine if significant differences existed between the perceptions of students and alumni at each of the two investigated schools. Significant differences between each sample's perceptions were not found. It appears that the program outcomes established for secondary sex education are being met as reported by students and alumni. Proportion of agreement by alumni at one school to several program outcomes in the areas of understanding of self and interaction skills warrants further consideration. It is possible that the long term impact of the course with respect to these outcomes may decrease with time. This would suggest a need to reinforce concepts associated with outcomes at various points in the high school experience, while addressing those factors which may be affecting the long term impact of sex education. From the results it can be concluded that given the rational, personnel, and outcomes intended for sex education, it is possible, at least for the subjects in this study, to enhance the cognitive, affective, and interpersonal skills of students and alumni on both a short and long term basis.

Daniel Klein, Ph.D.,
Northern Illinois University
DeKalb, IL 60115

Saturday, April 9
11:00 - 11:15 a.m.

THE PERCEPTIONS OF PROSPECTIVE TEACHERS TOWARD SEX EDUCATION. D. Davis, American Red Cross, Tuscaloosa, Alabama; Carl Westerfield; The University of Alabama.

The purpose of this study was to determine the perceptions of prospective elementary and secondary teachers toward sex education in the public schools. A 113-item questionnaire was administered to 124 teacher education students who were within one to three semesters of graduation. Chi square and descriptive statistics were utilized to analyze the data. Results indicated the prospective teachers favored the inclusion of co-educational sex education in the public schools' K-12 curriculum. They perceived their knowledge of human sexuality as good, felt comfortable in teaching and were willing to teach sex education. The prospective teachers rated their preparation to teach sex education as less than adequate; would have liked more sex education during the K-12 and college education and desired formal sex education instruction in their teacher preparation. Significant differences (P .05) were found between males and females in their willingness to teach varying topics, the appropriateness of certain topics, and the beginning grade level for some topics. Significant differences were found between grade level majors (K-6, 7-12, K-12) with regard to sexuality knowledge, willingness to teach specific topics to include in the curriculum, and the appropriateness of topics at certain grade levels. Data concerning the purpose(s) of sex education, sources of sex education, perceived opposition to public school sex education, who should develop and teach sex education curriculums were also presented.

Carl Westerfield
Health Education - HPER
University of Alabama
University, AL 35486

Saturday, April 9
11:15 - 11:30 a.m.

CHEMICAL FOREPLAY AMONG COLLEGE-AGE STUDENTS. Philip A. Belcastro, Southern Illinois University at Carbondale; Thomas J. Nicholson, Southern Illinois University at Carbondale.

Throughout the ages, human beings have consumed a wide variety of drugs to increase sexual desires, performance and pleasure. Recent research with university students have revealed a positive association between the use of drugs, both licit and illicit, and sexual activity. The purpose of this study was to determine whether individuals who use alcohol and/or marijuana prior to coitus have sexual behavior profiles significantly different than those individuals who do not use alcohol and/or marijuana prior to coitus. A sample of convenience which comprised 1,090 students and 5% of the student population was drawn. The Belcastro Sexual Behavior Inventory was utilized to collect the data. The analysis indicated that for this population experimentation with alcohol and marijuana prior to coitus is not atypical among college students. The pattern of sexual behaviors for black students was not all that dissimilar between those who did and did not use alcohol and marijuana prior to coitus. This was not true for white students. White females who used alcohol and marijuana prior to coitus had a sexual behavior profile which was in sharp contrast to those females who did not use these drugs prior to coitus. Females who utilized alcohol and marijuana prior to coitus were more orgasmic, petted more males, were petted by more males, had more males they exclusively dated for six months or longer, had more coital episodes per month, had more lifetime coital partners, had more coital partners five or more years older than them, had more coital partners they knew for less than 24 hours and were less likely to have an abortion and coitus with a fiance, than their cohorts. It was suggested that the use of these drugs be a form of "chemical foreplay" where they are used to enhance and culminate the coital episode. If the results reported here are replicated by future empirical research, then educational interventions which deal with drug use and sexuality as separate and distinct issues may be inadequate. A curriculum which challenges educators and students to examine the immediate and latent effects of drug use on sexual functioning may be more appropriate.

Philip A. Belcastro
Department of Health Education
Southern Illinois University
Carbondale, IL 62901

Saturday, April 9
11:30 - 11:45 a.m.

"SEASIDE"---A MODEL FOR SCHOOL HEALTH EDUCATION INSERVICE.

Judy C. Drolet, Ph.D., Southern Illinois University.

Workshops known as the Seaside Health Education Conferences (SHEC) are held annually in Oregon to provide health education and wellness inservice for school personnel. One outgrowth of these workshops is the allocation of federal funds for Nutrition Education Training Programs (NETP) to improve nutrition and other health knowledge, attitudes, and role model behaviors of the spectrum of school personnel. The purpose of this study was to assess whether selected Oregon school personnel perceived more health-related changes after participation in the SHEC and NETP wellness-oriented programs as compared to school personnel not participating in these projects. All study participants were divided into Experimental and Control groups. Of the randomly selected subjects, 172 who represented all phases of the school health program responded to a mailed questionnaire. From a second random sample of 78 subjects, 74 participated in individual interviews. Results indicated that SHEC/NETP subjects perceived more positive health behavior changes, particularly in the areas of exercise, nutrition, weight loss, and stress management. Furthermore, school personnel were perceived more as important positive health role models by SHEC/NETP subjects. Based on these findings, SHEC conference participants, as well as other personnel in their schools, reported making positive health-related behavior changes. This personal application of the wellness lifestyle should remain a focal point of SHEC and other conferences following the "Seaside" design. Workshop sessions should provide information and examples of ways to initiate and maintain behavior changes. The importance of school personnel as role models of positive health attitudes and behaviors was underscored also in the study data. The underlying emphasis on school personnel as positive role models should be retained as a characteristic of future Seaside Health Education Conferences. Other wellness-oriented programs should consider incorporating role modeling as a feature of inservice.

Dr. Judy C. Drolet
Department of Health Education
Southern Illinois University
Carbondale, IL 62901

Saturday, April 9
11:45 - 12:00 p.m.

EVALUATION OF A SCHOOL HEALTH EDUCATION CURRICULUM: IMPLEMENTATION ANALYSIS AND OUTCOME ASSESSMENT. R. S. Gold, Southern Illinois University, Carbondale, IL; C. E. Basch, Russell Sage College, Troy, NY.

The purpose of this study was to explore the relationship between the extent of implementation of a health instruction curriculum (School Health Curriculum Project [SHCP]), and changes in students' health-related knowledge, attitudes and self-reported health practices. In all, 570 students, representing 28 classrooms were involved in the current evaluation. The curriculum was implemented in 13 classrooms (n=290 students), and 15 classrooms served as control sites (n=280 students). Data collection procedures involved a pretest and posttest of all students' health-related knowledge, attitudes and self-reported behaviors, as well as daily monitoring of curricular implementation by teachers in five of the SHCP classrooms. The current evaluation provided clear evidence that the SHCP curriculum, as implemented, resulted in statistically significant gains in knowledge. The attitude scaling indicated that the SHCP as implemented had only isolated impact on attitudes towards smoking. Data on self-reported health behaviors were mixed, although indicative of positive short-term changes. The most revealing results of the study were related to the implementation data. Following meticulous planning and teacher training, there were extreme variations in the levels of implementation ofthe SHCP activities and use of related materials. This indicated that regardless of strong and consistent increases in knowledge in all SHCP sites, these changes were not related to levels of implementation of the curriculum. While these results must be considered in light of some limitations, it must be concluded that the relationship between curricular implementation and outcome measures were not educationally significant. There are few comparable studies against which to compare these results. Although these data are unique for SHCP in this site, they should provide a firm foundation and model for further examination of the impact of curricular implementation of health programs on outcome measures.

Robert S. Gold, PhD, DrPH
Dept. of Health Education
Southern Illinois University
Carbondale, IL 62901

Saturday, April 9
12:00 - 12:15 p.m.

EXAMINING DIFFERENTIATION IN MOTOR PROFICIENCY THROUGH EXPLORATORY AND CONFIRMATORY FACTOR ANALYSIS. Geoffrey D. Broadhead, Louisiana State University, Baton Rouge, Robert H. Bruininks and Geoffrey Maruyama, University of Minnesota, Minneapolis.

Research which describes the structure of motor proficiency has used only exploratory factor analysis. In this study both exploratory and confirmatory techniques were used to examine the differentiation of motor proficiency through childhood. Using data from the short Bruininks-Oseretsky Test, the exploratory analyses were conducted first. This was to ensure that the matrices were non-singular, and therefore amenable to confirmatory factor analysis, while also determining whether the data could be summarized by a smaller number than the eight subtests. Subsequently, the confirmatory factor analyses were used to fit the data to an a priori factor structure which viewed the subtests as conceptually distinct. The sample of non-handicapped students (N=783) was divided by sex and into four age groups covering the range four to sixteen years. The exploratory analyses indicated not only that the confirmatory analyses were possible, but also supported the notion of increased differentiation with age. For example, the first factor accounted for approximately 40% of the variance for the youngest samples of boys and girls, but only 20% for the older groups. The confirmatory analyses supported the conclusions of the exploratory analyses. For each of the youngest samples of boys and girls, items within the eight subtests were consistent with one another, and each subtest was significantly correlated with all the other subtests. For older children, however, the picture changed considerably. Arguing for greater differentiation, many of the correlations between subtests were non-significant. Further, even items within subtests did not load together, pointing also to differentiation within subtests for these subjects.

Geoffrey D. Broadhead
School of HPERD, Gym Armory
Louisiana State University
Baton Rouge, LA 70803-5606

Saturday, April 9
1:15 - 1:30 p.m.

SMALL SAMPLE VALIDATION OF DISCRIMINANT ANALYSIS OF MOTOR PROFICIENCY DATA. Gabie E. Church and Geoffrey D. Broadhead, Louisiana State University at Baton Rouge.

The multivariate procedure of discriminant analysis has been shown to be a versatile statistical tool for the consideration of questions concerning group performance differences, and the classification of individuals into discrete categories. For example, it has been used to describe the physiology of good and elite distance runners, to indicate the personality and body image differences of high and low body fat adult females, and to examine movement performance characteristics of mildly mentally retarded and non-handicapped children. In order to validate the classification estimates, those studies used the resubstitution method presented in the SPSS computer package. That method yields optimistically biased estimates of correct classification. This study describes the use of an alternative, less-biased method, called the jackknife, and contrasts the classification results obtained with those from the resubstitution method. Gross and fine motor proficiency data, obtained from four (N=67) intact physical education classes (grade one, kindergarten, mildly mentally retarded, and moderately mentally retarded), were analyzed and classified by the SPSS resubstitution method. The overall correct classification was 74.6% (73.9%, 84.6%, 50.0%, and 75.0%). Using the jackknife method, which is particularly suitable for small samples, the corresponding percentages were 59.7% (65.2%, 76.9%, 20%, and 37.5%). These results provide more realistic estimates from which to evaluate the discriminant functions and make research decisions. The use of the jackknife technique highlights differences among the four classes, by showing that the reduction in percentage correct classification was especially noticeable with the two mentally retarded classes.

Gabie Church
Dept. of Experimental Statistics
Louisiana State University
Baton Rouge, LA 70803-5606

Saturday, April 9
1:30 - 1:45 p.m.

THE PERFORMANCE STATUS OF 4TH, 7TH, AND 10TH GRADE REGULAR AND SPECIAL EDUCATION CHILDREN ON SELECTED PSYCHOMOTOR SKILLS.

Philip Reuschlein and Paul Vogel, Michigan State University; Edward Roeber and Sharif Shakarni, Michigan Department of Education.

The purpose of this study was to determine the performance levels of entering fourth, seventh, and tenth grade regular education and special education students on selected psychomotor skills. Seventeen essential skills in the areas of fundamental movement, body management and physical fitness were selected to be tested as part of the Michigan Educational Assessment Program (MEAP). A stratified (by geographical area and community type) random sample of over 1500 regular and 700 special education students was drawn for the study. In total, 117 schools from 61 districts were selected. The fourth, seventh, and tenth graders were tested on 16, 15, and 4 performance objectives, respectively. A team of 26 testers were trained to administer the test battery, and to observe and record both qualitative and quantitative data on student performances. Test manuals, training films, and practice sessions were used to assist the test administrators in achieving testing accuracy scores of 80% or higher. All data were collected in October 1981. The performances of regular and special education students were below the standards of minimal performance considered appropriate for at least 75% of the Michigan school children on all test items. The average percent of regular education students attaining the objectives was higher than that of the special education students in all competency areas and at all grade levels. However, the higher grade levels did not always show higher achievement levels than did the lower grade levels. In 8 cases, the higher grade levels had lower percents of attainment than did the lower grade levels. In only four cases, did the higher grade levels have higher achievement levels than the lower grade levels. A review committee assembled by the Michigan Department of Education felt that the test results may indicate a decrease of emphasis on skill development in the areas tested. The poor performance also may be the result of a decrease in the emphasis on quality PE programs. It is recommended that additional time be devoted to the study of the time allotted to instruction, teacher effectiveness and school effectiveness variables, and other contextual variables that will provide insight into what types of changes need to be made to improve student performance levels.

Philip Reuschlein
Dept. HPE, Rm. 40, IM Circle Bldg.
Michigan State University
East Lansing, MI 48824

Saturday, April 9
1:45 - 2:00 p.m.

BODY COMPOSITION IN AN INSTITUTIONALIZED MENTALLY RETARDED POPULATION. James H. Rimmer, Manhattan College; Joel Rosentswieg, Texas Woman's University.

The validity of 12 previously published regression equations was determined to predict the body density and percent body fat of institutionalized mentally retarded adults. The subjects were 32 moderately retarded adult males and 25 moderately and severely retarded adult females, aged 18 to 40 years. Hydrostatic weighing at total lung capacity (TLC) was used as the validity criterion. Residual volume (RV) was computed using the helium dilution technique on 12 subjects. No significant difference was found between the actual RV and a constant value as proposed by Wilmore (1969). The constant value was added to the forced vital capacity (FVC) to obtain each subjects' TLC measure. A significant difference exist d between the criterion measure and the selected regression formulas of Jackson and Pollock (1978), Sloan and Weir (1970), and Pollock et al. (1975). There was no significant difference between the criterion measure and the other nine equations. Pearson product-moment correlations were employed to determine the relationship between the regression equations and the criterion measure. The constant error and standard error of estimate were computed to determine the efficacy of each equation as a predictor of percent body fat. The results of the study found that the generalized equations of Jackson, Pollock, and Ward (1980) for women, and Durnin and Womersley (1974) for men, had a relatively high correlation coefficient (JPW = .92, DW = .84), low standard error of estimate (JPW = 2.52, DW 4.13), and low constant error (JPW = 0.23, DW = -0.10). These equations may be used with institutionalized mentally retarded adults to predict body density and percent body fat with reasonable accuracy.

Dr. James H. Rimmer
Dept. of Health and Phys. Ed.
Manhattan College
Bronx, NY 10471

Saturday, April 9
2:00 - 2:15 p.m.

PERCEIVED TEACHING COMPETENCIES IN ADAPTED PHYSICAL EDUCATION: SUGGESTIONS FOR TEACHER TRAINING. Gail M. Dummer, Indiana University, Bloomington.

To determine the need for changes in adapted physical education teacher certification requirements in Maryland, a survey instrument was distributed to every regular physical educator, adapted physical education specialist, and physical education supervisor in each of Maryland's 24 local public school systems (LEAs). Of the 2293 survey recipients, 885 physical educators returned completed surveys which described their work history in physical education, educational/coursework background, "hands-on" experience with handicapped students, and perceived teaching competencies in adapted physical education. Teachers generally ranked themselves as competent or confident with respect to their knowledge of motor development, behavior management, handicapping conditions, and the role of the adapted physical education specialist. Most respondents ranked themselves as deficient or insecure on items concerning assessment of motoric problems, individualizing instruction, the IEP process, and current State and federal laws. Only 26.4% of the respondents indicated comfort in teaching handicapped students. Chi-square analyses revealed that competence on survey items and comfort in teaching were positively related to amount of preservice and inservice coursework completed and to hands-on experience. Results also indicated that 82.2% of all inservice courses and non-credit workshops in adapted physical education were offered by LEAs rather than college and universities or the State Board of Education, and that approximately 15% of the respondents had participated in such courses. These findings collectively indicate that physical educators in Maryland require additional teacher training in adapted physical education. Furthermore, a comparison of these survey results with needs assessments conducted in other areas of the United States revealed similar teacher training needs across the country. Recommended actions to encourage such teacher training include upgrading certification requirements, updating college and university curricula, and increasing the availability of inservice and workshop courses offered by the LEAs and other educational agencies.

Gail M. Dummer
Department of Physical Education
Indiana University
Bloomington, IN 47405

Saturday, April 9
2:15 - 2:30 p.m.

EFFECTS OF UNCERTAINTY OF TIME AND OCCURRENCE ON REACTION TIME OF MILD AND MODERATELY MENTALLY HANDICAPPED PERSONS. Paul R. Surburg, Indiana University.

Variation of foreperiods as a function of uncertainty of time and use of catch-trials as a function of uncertainty of occurrence furnish insight into the psychomotor processing of subjects and provide direction concerning assessment of mentally handicapped persons' reaction time (RT). No studies have investigated the effects of uncertainty of occurrence (catch-trials) and of time (foreperiods) upon mild (MiMH) and moderately mentally handicapped (MoMH) subjects and their normal counterparts. Ninety subjects from Bloomington High School North and Stone Belt School participated in this study. Randomly varied foreperiods of 1.5, 3.0 and 4.5 seconds were presented to all subjects. A catch-trial consisted of a warning signal without stimulus presentation. Subjects were randomly assigned to the following treatment groups: no catch-trials, 10 percent catch-trials and 20 percent catch-trials. Twenty-one recorded trials comprised a testing session; subjects were tested on three different days. A four-way ANOVA (intelligence x treatments x days x foreperiods) revealed significant main effects for intelligence, days and foreperiods. Significant interaction effects were found for intelligence x foreperiods and treatment x foreperiods. Subsequent analyses revealed significant differences among the foreperiods for MiMH subjects; uncertainty of time did not affect the normal or MoMH subjects in this manner. Significant differences among the levels of intelligence were found for the three foreperiods. When catch-trials were not presented, significant differences were found among the foreperiods; the presence of catch-trials resulted in no significant differences among foreperiods. In conclusion, uncertainty of time had different effects on the RT of MiMH and MoMH subjects. Uncertainty of occurrence did not differentiate among intelligence levels but did influence RT performance.

Paul R. Surburg
Department of Physical Education
Indiana University
Bloomington, IN 47405

Saturday, April 9
2:30 - 2:45 p.m.

EFFECTS OF IMITATIVE LEARNING ON THE ACQUISITION OF A MOTOR SKILL BY EDUCABLE MENTALLY RETARDED BOYS. Mark Nierengarten, Indiana University, Bloomington.

One rationale for mainstreaming is that mentally retarded students may learn to model the positive learning behaviors of their normal peers. The purpose of this research was to determine whether motor skill learning rates of mildly mentally retarded boys could be influenced by nonretarded adult and same aged peer models. Sixty male subjects were randomly assigned to groups with the following model types; adult non-competent, adult competent, peer non-competent, and peer competent. Models were trained to provide cues regarding the performance of a pursuit rotor task. Adult models were young adult males; whereas, peer models were boys aged 10 to 12 years. Competent models exhibited skilled performance techniques; whereas, non-competent models exhibited erratic non-skilled task behavior. Subjects viewed their respective model on videotape before attempting the task. Time-on-target was measured across five blocks of four trials each. Anova (model age x model competence x replicate models x subjects x blocks x trials) was conducted to determine the effects of model age, model competency and the interaction of age by competency. All groups demonstrated a significant learning effect as indicated by a significant block effect. There were no statistically significant differences for age, competence of models or for their interaction. These results are in conflict with the research literature on normals which suggests that a model's age and competence should be important characteristics for influencing learning. The study suggests that the factors which influence retarded populations may differ from those which influence normal populations.

Mark Nierengarten
517 South Swain
Bloomington, IN 47401

Saturday, April 9
2:45 - 3:00 p.m.

COINCIDENCE ANTICIPATION AND THE SPACE-TIME CONCEPT IN MENTALLY RETARDED AND NON-RETARDED INDIVIDUALS. Janis H. Martin, The University of Tennessee, Knoxville.

The purpose of the investigation was to explore the existence and nature of the relationship between the level of maturity in the space-time concept and the ability of individuals to accurately perform skills involving the interception of a moving stimulus. The sample consisted of 53 subjects in the following categories: (a) educable mentally retarded, aged 5 to 7 years; (b) educable mentally retarded, aged 13 to 15 years; (c) educable mentally retarded, aged 18 to 21 years; (d) trainable mentally retarded, aged 13 to 15 years; (e) trainable mentally retarded, aged 18 to 21 years; (f) non-retarded, aged 5 to 7 years; and (g) non-retarded, aged 13 to 15 years. There were 29 males and 24 females in the sample. In Part I of the study the space-time concept was operationally defined as the cognitive component of the ability that enables individuals to make relative velocity judgements; specifically, the ability to monitor two simultaneously presented stimuli of apparent motion and to determine: (a) whether their velocities were equal or unequal, and (b) if unequal, to indicate which was the faster and which was the slower of the two. In Part II of the study the capacity to intercept a moving stimulus was operationalized as a receptor anticipation laboratory task which required a button press response to apparent motion at each of two velocities (3 and 7 mph), with stimulus duration held approximately constant. Absolute error was the measure employed to score coincidence anticipation performance. Employment of the Kruskal-Wallis analysis of variance resulted in rejection of the null hypothesis of no difference in receptor anticipation performance among the three space-time concept categories. The Mann-Whitney U procedure demonstrated a significant difference in receptor anticipation performance between the Immature group and both the Mature and Intermediate space-time concept groups; however, no significant difference was demonstrated between the Mature and Intermediate space-time concept groups. It was concluded: (a) that the relative velocity judgement task differentiated groups which could be assumed to represent differences in ability to deal cognitively with space-time relationships, and (b) that coincidence anticipation performance was differentiated by two of the space-time concept groups. The difference found was interpreted to be associated with a difference between those displaying no pattern, and presumably no strategy, and those displaying any sort of consistent response pattern.

Janis H. Martin
The University of Tennessee
Division of Physical Education
Knoxville, TN 37916

Saturday, April 9
3:00 - 3:15 p.m.

PERFORMANCE ERROR IDENTIFICATION AS A FUNCTION OF VISUAL AND VERBAL TRAINING. Charles W. Armstrong, Mark Nash, University of Toledo.

An essential component of the motor skill instructor's role in administering feedback is the process of detecting errors in a learner's response. While a number of factors that influence this process have been identified, there is little data to indicate how proficiency in error detection can be enhanced. Thus, the purpose of this investigation was to examine the impact of three training strategies on error detection proficiency. Subjects were undergraduates enrolled in Beginning Racketball (N = 40) and Jogging (N = 10). Three experimental groups (10 racketball subjects in each) and two control groups (10 racketball subjects, 10 jogging subjects) were established. During the first week, a 16-item error detection test consisting of filmed examples of racketball strokes was administered. The test required subjects to recognize correct and incorrect performance, on the basis of pre-established criteria. Over the next seven weeks, each experimental group received 14 ten-minute training sessions which focused on discriminating between correct and incorrect stroke execution. One group (VE) received this information through verbal presentations from the experimenter. A second group (VI) received the same information, but visually through a series of films. The third group (VV) received both verbal and visual information simultaneously. Following completion of the training, the error detection test was re-administered. The results were used to identify the impact of the training on three dependent variables: correct element recognition, incorrect element recognition, and observer certainty. The analysis revealed improvement on two of the measures by the experimental groups, but no improvement for either of the control groups. Improvement was evidenced in the number of incorrect elements identified and in the subjects' certainty of their responses. The experimental groups could be differentiated only on the number of incorrect elements correctly identified, with the performance of the (VI) group significantly better than that of the (VE) group. The results indicate that training activities can enhance error detection proficiency. When the task involves visual observation, it appears that training with visual stimuli produces results superior to training with verbal stimuli. Combining both types of stimuli simultaneously in training may overload the information processing capacity of the individual, thus detracting from the intended purpose of the training.

Charles W. Armstrong
Dept. of Exercise Science & P. E.
University of Toledo
Toledo, OH 43606

Saturday, April 9
3:30 - 3:45 p.m.

EFFECTS OF DEPTH AND ENVIRONMENT ON THE CAPABILITY OF THE SUBMERGED OPERATOR. E. Keith Milner, Department of Physical Education, University of Illinois, Champaign, Illinois 61820, and P. A. Hancock, Motor Behavior Laboratory, Institute for Child Behavior and Development, 51 Gerty Drive, University of Illinois, Champaign Illinois 61820.

Two experiments were conducted which examined the effect of environment and depth upon the submerged operator in the performance of a simple manual dexterity task. Using a counterbalanced order of exposure design, the first experiment monitored assembly and disassembly of bolt combinations at a shallow 3.7m depth in both swimming pool and open ocean conditions. Results indicated an effect for environment of performance as total assembly/disassembly completion time was significantly higher in the open ocean compared to the swimming pool. Subsequent analysis revealed that the retarding effect of the ocean was due solely to an increase in assembly time as disassembly time did not vary across conditions. A possible assymetric transfer effect for order of exposure (Poulton, 1982) was partially palliated by previous diver experience on task. The interruptive effect of the ocean is posited as due predominately to mechanical interference of wave surge upon movement precision, although the additional attentional demands of the more varied environment may exert an effect also. In the second experiment, six additional experienced divers performed the same manual dexterity task at 4.6 and 15.2m ocean depth. At the shallower exposure, completion time was comparable to that found in the previous experiment. However, the additional 10.6m in depth elevated performance completion time by 11% for the simple dexterity task. These latter data affirm and augment previous observations concerning the performance of experienced divers in relatively shallow ocean depths (Hancock & Milner, 1982; Weltman, Christianson & Egstrom, 1970). The overall results from the present experiments suggest two important practical caveats for those concerned with task performance underwater. First, efficiency on simple manipulative tasks declines fairly rapidly even for experienced divers at relatively shallow ocean depths. Second, it is not feasible to extrapolate open ocean performance directly from that adduced at comparable swimming pool exposures.

E. Keith Milner
Department of Physical Education
University of Illinois
Champaign, IL 61820
217 333-6563

Saturday, April 9
3:45 - 4:00 p.m.

AGE DIFFERENCES IN COINCIDENT ANTICIPATION: PREFERRED MOVEMENT SPEED AND STRATEGY USE. Kathleen Williams, University of Oklahoma.

This investigation was performed to describe and explain age-related limitations in response accuracy on a coincident anticipation task. Previous research had shown a consistent pattern of results for timing experiments: Young children respond early when stimuli travel slowly. They are late when stimulus velocities are fast; they are most accurate at intermediate speeds. Older children and adults are more accurate at slow to intermediate speeds; they are less accurate at fast velocities. Use of a preferred movement speed was hypothesized as one possible explanation for these results, particularly for the youngest children. Five, 7 & 9 year old boys (N=14 per group) were tested in this investigation. During an initial session, each individual's preferred movement speed was estimated. They performed a horizontal arm movement like one that would be used when performing the anticipation task. In a second session, individuals responded to stimuli produced by the Bassin Anticipation Timer. The children were asked to make a simple arm movement that would end with contacting a microswitch at the same time the lights reached the end of the runway. One stimulus traveled at the individual's preferred speed; four others were selected in .8 mph increments from that "baseline" preferred speed (two faster, two slower). As hypothesized, the 5 year olds responded accurately when the light speed matched their preferred speed. At other velocities, they either moved too fast, or too slowly. Seven and 9 year old children were able to match their arm speeds to stimulus velocities up to and including their preferred speed. At higher velocities, they moved too slowly. Observation suggested that most children were attempting to use a rudimentary response strategy by 7 years of age.

This study was submitted in partial fulfillment of the Ph.D. requirement at the University of Wisconsin-Madison, under the supervision of Dr. L.E. Halverson. Partial funding for the project was provided by Sigma Xi, the Scientific Research Society.

Kathleen Williams
Dept. of H.P.E.R.
University of Oklahoma
Norman, OK 73019

Saturday, April 9
4:00 - 4:15 p.m.

REACTION TIME AND STIMULUS MODALITY: CAN VISUAL DOMINANCE BE ATTENUATED? Gary Kamen and Harold H. Morris, Indiana University.

It is well known that reaction time to a visual stimulus is longer than that to other stimulus modalities. The present study sought to determine whether subjects could be trained to respond faster after learning to react to a stimulus that evoked a rapid response than one which produced a slower response. Twenty-seven subjects, randomly assigned to three treatment groups, were tested over seven days. The first four days served as a training period during which subjects were trained to respond to either (1) a proprioceptive-only stimulus (during which blindfolded subjects responded to the movement of manipulandum which lengthened the left wrist extensors), (2) a visual stimulus (watched the manipulandum), or (3) combined visual and proprioceptive stimuli. On each day, subjects responded to 30 trials under the assigned stimulus condition. The foreperiods varied between 1.5 and 3.5 secs in 0.5 sec increments. The subjects were instructed to respond to the stimulus with a rapid movement of the right wrist extensors. Over the last 3 days, each subject was tested in each stimulus modality (one stimulus condition per day) in a counterbalanced design. Reaction times (in msec) for the three conditions and the three groups are given in the Table:

		Stimulus Conditions			
		Visual	Proprioception	V&P	Mean
Treatment Groups	V	229.1	212.2	209.2	216.8
	P	212.4	200.8	192.8	202.0
	V&P	220.4	203.8	203.1	209.1
Mean		220.6	205.6	201.7	

An analysis of variance revealed that the stimulus conditions produced highly significant differences in reaction time ($p < .01$) with no significant differences between groups. It was concluded that responses to visual stimuli cannot be improved by prior training using faster proprioceptive pathways.

Supported by a grant from the Spencer Foundation

Gary Kamen
Department of Physical Education
Indiana University
Bloomington, IN 47405

Saturday, April 9
4:15 - 4:30 p.m.

MOTOR LEARNING OF INVARIANT CHARACTERISTICS AND PARAMETERS. David J. Langley, Purdue University; H. N. Zelaznik, Purdue University.

Previous research in motor control has established relative timing (phasing) as an important structural characteristic of skilled movement. In addition, overall duration is viewed as a flexible parameter in that the movement can be produced at different speeds while retaining the phasing structure. In three experiments, we examined the hypothesis that specific training concerned with phasing results in better learning than training concerned with overall duration of a task. A transfer of training design was employed in these experiments. Groups of subjects were trained to knock down three barriers with the segment times between barriers as a goal (phasing-trained) or the overall duration as a goal (duration-trained). The results clearly indicated that phasing training resulted in equivalent performance on the novel duration transfer task but superior performance on the novel phasing transfer task. It is suggested that training concerned with an ongoing process of movement (phasing) is more beneficial for learning than training concerned with an end product of movement (duration). In addition, the capability of phasing-trained subjects to modify their learned patterns during phasing transfer performance is not congruent with generalized motor program theory, which holds that phasing is a non-modifiable characteristic of performance.

David J. Langley
PEHRS Department
Purdue University
West Lafayette, IN 47907

Saturday, April 9
4:30 - 4:45 p.m.

AGE DIFFERENCES IN THE EFFECTS OF GUIDED AND DISCOVERY STRATEGIES ON THE LEARNING, RETENTION, AND TRANSFER OF A SIMPLE MOTOR SKILL.

Rosaland V. Edwards and Amelia M. Lee, Louisiana State University.

Several studies have shown that for adult subjects a guided strategy will result in more efficient learning of initial tasks, but a discovery strategy aids retention and transfer. This study tested the guided vs. discovery learning, retention and transfer effect developmentally. Two groups of 10 subjects (5 boys and 5 girls) were randomly formed at each of three age levels (6, 8, and 10 yrs). Children learned a simple novel motor task in either a guided condition (subject was led through a series of movements to the desired task criterion) or a discovery condition (subject was forced to discover the series of movements needed for reaching task criterion). Retention and transfer performances were measured after two-min intervals respectively. Scores for initial learning, and transfer were recorded as movement time to complete the task after the learning criterion had been reached. In addition, total learning time was recorded in seconds for initial and transfer tasks. Movement time scores obtained were analyzed in a 3 (age) X 2 (sex) X 2 (guided condition - discovery condition) X 3 (learning task - retention task - transfer task) ANOVA with appropriate followup analyses. Generally, older children performed better than younger children, but there were no meaningful age X condition interactions. A finding of major interest was a significant condition X task interaction, indicating significant differences between guided and discovery conditions for initial learning but not for retention and transfer. Movement time for initial task was significantly lower for subjects in the guided condition. Additionally, a 3 (age) X 2 (sex) X 2 (guided condition - discovery condition X 2 (learning task - transfer task) ANOVA with total learning time as the dependent measure also indicated a condition X task interaction. Time needed to learn the transfer task was significantly lower than time needed to learn the initial task for the discovery group when compared to the guided group. Thus, for these groups, using movement time, a guided strategy was most efficient if initial task accomplishment was the goal. These findings support earlier findings. Using movement time as the measure, discovery did not aid retention or transfer. When looking at time needed to learn a new task, however, subjects learning in a discovery environment were more efficient in transfer.

Rosaland V. Edwards
School of HPERD, La. State Univ.
Baton Rouge, LA 70803

Saturday, April 9
4:45 - 5:00 p.m.

RESPONSE PREPARATION METHODS IN MOTOR PROGRAM CONSTRUCTION EMPLOYING THE FINGERS AND HANDS. Betty Ann Turpin, University of Wisconsin, Madison.

Numerous researchers have sought to elucidate those factors which contribute to response organization. One such influential factor found to affect reaction time is the effect of response-response compatibility (Berlyne, 1957; Sanders, 1970; Rosenbaum and Kornblum, in press). That is, the latency of a particular response may be influenced not merely by the number of other responses but also by the type (kind) of other responses. In question in this series of experiments is the hypothesis proposed by Rosenbaum and Kornblum which stated that the level of response uncertainty influences the method of response preparation, and therefore, the relationship between the fingers and hands. Specifically, a high level of response uncertainty (in this series a high number of response alternatives) should enhance an individual response preparation producing faster finger transitions compared to hand/finger-hand transitions. In contrast, a low level of response uncertainty should enhance multiple response preparation where hand/finger-hand transitions should be faster than finger transitions. In Experiment 1 subjects were required to make a rapid discrete key press in response to one of either two or four stimulus lights under three expectancy levels and two response alternative conditions: in a completely within subjects (18) by alternatives (2) by expectancy (3) by fingers (4) factorial design. Experiment 2 was designed to create a situation where an equal number of finger and hand/finger-hand transitions existed (using three fingers). Subjects may have adopted either response preparation method in this experiment. A completely within subjects (12) by condition (4) by transitions (3) factorial design was employed. The results support the notion that response preparation methods are influenced by the number of response alternatives. The reaction time data revealed that with a low number of response alternatives hand/finger-hand transitions were faster than finger transitions. The converse was true under a high number of response alternatives. Further, there were clear expectancy differences suggesting the existence of different programming operations.

Betty Ann Turpin
University of Wisconsin
2000 Observatory Drive
Madison, WI 53706

Saturday, April 9
5:00 - 5:15 p.m.

EFFECTS OF ORGANIZATION ON MOVEMENT RECALL FROM SHORT-TERM MEMORY BY SENIOR AND YOUNG ADULTS. Alan L. Lambert, Pennsylvania State University.

The influence of three organizational patterns on the short-term motor recall performance of senior and young adults was investigated. Five different movements were randomly presented, from subjects' right to left, on a linear positioning apparatus and recalled in one of three orders: experimenter produced order (EPO), subject discovered order (SDO), or forced random order (FR). Forty-eight senior adults (24 male and 24 female) and forty-eight young adults (24 male and 24 female) were equally divided among the three reproduction conditions: EPO, SDO, and FR. A 3 X 2 X 2 X 5 (Reproduction Condition x Age x Gender x Distance) ANOVA, with repeated measures on the last factor, was used to analyze mean absolute error scores. Gender was not found to be an important factor in recall from short-term motor memory. However, a significant two-way interaction between reproduction condition and age was found. Analysis of the interaction revealed no significant differences for age in the EPO group. However, young adults had a significantly lower mean error score than senior adults in both the SDO and FR groups. The data collapsed across age indicated that the EPO group had a significantly lower mean error score than both the SDO and FR groups which were not significantly different from each other. The results provided evidence supporting the importance of organizational abilities of senior adults with respect to short-term motor recall. When senior adults were experimentally provided a systematic, and consistent recall organization, their performance equalled that of young adults. Further analysis indicated a significant interaction between reproduction conditions and distance. Subjects may have used different locations, dependent on reproduction condition, as a reference mechanism for recalling the five distances.

Alan L. Lambert
Motor Behavior Laboratory
Pennsylvania State University
University Park, PA 16802

Saturday, April 9
5:15 - 5:30 p.m.

HAMSTRING/QUADRICEPS STRENGTH RATIOS IN COLLEGIATE VARSITY MIDDLE DISTANCE RUNNERS. Alfred Morris, Louis Lussier, Gerald Bell, Jeff Dooley, University of Illinois.

The purpose of this study was to measure the strength and power of the knee extensors and flexors in a collegiate varsity team of cross country and middle distance runners. Authors have suggested if there is an imbalance right to left sides, or between the muscles on the front to back of the thigh, then the runner will be more susceptible to injury. The subjects were 14 varsity athletes from a Big Ten university who gave their informed consent to participate in the study. The subjects were measured for knee extension and knee flexion strength on a Cybex II isokinetic dynamometer. Testing was done at 30, 180 and 300°/sec. Table 1 shows the quadriceps torque and hamstring torque for these athletes in each of the test conditions.

Table 1. Hamstring/Quadriceps Torque in Runners

Hamstring Torque $\bar{X}$ (S.D.) in Ft. Lbs.

30°/sec	180°/sec	300°/sec
87.0 (10.04)	66.1 (10.83)	51.4 (10.49)

Quadriceps Torque $\bar{X}$ (S.D.) in Ft. Lbs.

30°/sec	180°/sec	300°/sec
139.2 (17.32)	88.2 (14.94)	59.3 (12.41)

Results indicated that the greatest torque was recorded at an isokinetic speed of thirty degrees per second. When a ratio was formed evaluating the hamstring/quadriceps ratio, it was noticed that this ratio was lowest at the speed which produced the highest torque. This ratio was .63 at 30°/sec. The ratios increased to .75 and .87 as the angular isokinetic speed was increased to 180°/sec and 300°/sec. It may be seen that the hamstring/quadriceps ratio varies with the angular velocity setting. Recommended ratios of .65 to .75 which exist in the literature must be compared to isometric values or values derived at very slow speeds of movement. Based upon the results of this study, it is concluded that torque decreased in the quadriceps at a greater rate than in the hamstrings as the velocity of contraction increased. Further, it is noted that the hamstring/quadriceps ratio varies between .63 at very slow speeds and .87 at very high speeds. This would indicate that the hamstring/quadriceps ratio does not appear to be of any fixed value, and is probably best evaluated in conditions where the velocity of contraction is similar to those used in the event of the athlete.

A. Morris, University of Illinois
Rehabilitation Research Laboratory
1207 South Oak Street
Champaign, IL 61820

Saturday, April 9
9:00 - 10:00 a.m.

THE RETENTION OF FLEXIBILITY IN SELECTED JOINTS AFTER THE CESSATION OF A STRETCHING EXERCISE PROGRAM. Carole J. Zebas and Mary Lou Rivera, University of Kansas.

Seventy-nine subjects enrolled in four coeducational high school physical education classes participated in one of three stretching exercise programs designed to improve flexibility in selected joints. The exercise groups were ballistic stretch (n=19); static stretch (n=19); and modified PNF (n=18). The fourth group served as a control group (n=23). Joint range of motion was measured with a Leighton flexometer at the ankle, shoulder, hip, trunk and neck joints. Measurements were taken on four occasions: pre-and-post exercise, two weeks after the cessation of exercise, and four weeks after the cessation of exercise. Statistical analysis using ANOVA-ANCOVA with repeated measures indicated significant gains in flexibility from pre-to-post testing in all exercise groups with the static stretch and modified PNF stretch being superior to the ballistic stretch exercise ($p<.01$). The overall percentage gain in flexibility ranges from 30-36%. The superiority of the static stretch and modified PNF stretch over the ballistic stretch was also supported in the retention testing sessions. In general, the following conclusions were reached regarding the retention of flexibility after the cessation of exercise: (1) Two weeks after the cessation of exercise, 87.4% to 92.2% of the flexibility gained during the exercise program was retained; (2) Four weeks after the cessation of exercise 83.2% to 90.2% of the flexibility gained during the exercise program was retained.

Carole J. Zebas
Dept. of HPER
University of Kansas
Lawrence, KS

Saturday, April 9
9:00 - 10:00 a.m.

57

THE EFFECTS OF DYNAMIC RANGE OF MOTION EXERCISES AND STATIC STRETCH ON STRENGTH AND RANGE OF MOTION OF THE HIP JOINT.

Carol A. Kanetzke, South Dakota State University.

The effects of dynamic range of motion exercises and static stretch on hip flexibility and hip strength were examined as well as the relationship between hip flexibility and hip strength. One-hundred and one college-age male and female students were divided into three groups: dynamic range of motion (D'ROM)(n=32), static stretch (ST)(n=34), and control (C)(n=35). All subjects were measured before and after treatment for hip flexibility, using a Leighton flexometer, and for hip strength, using a cable tensiometer. Treatment consisted of two specific hip flexibility exercises performed twice per week for seven weeks by the D'ROM and ST groups. The gain scores of the dependent variables, hip flexibility and hip strength, were each analyzed by a two-way ANOVA (sex X treatment). Tukey's HSD test was used for all pairwise comparisons. Zero-order and partial correlation coefficients, controlling for sex, were calculated between flexibility and strength for pretest, posttest, and gain measures for all groups, including a pooled D'ROM-ST group (D-S). D'ROM had a significantly greater increase of hip flexibility than ST ($p<.05$) and C ($p<.05$) with gains of 9.37, 1.07, and 1.50 degrees, respectively. No significant difference was found between ST and C. D'ROM had a significantly greater increase of hip strength than C ($p<.05$) with gains of 18.23 and 5.19 pounds, respectively. No significant difference was found between D'ROM and ST which had a strength gain of 9.92 pounds. Females increased strength significantly more than males ($p<.05$) with 16.01 pounds as the gain score, as compared to a gain of 6.11 pounds for males. No significant difference was found between sexes in gain scores of flexibility. Interaction was not significant between sex and treatment for flexibility or strength measures. Significant partial correlations ($p<.05$) were found for ST (.605) and D-S (.438) for pretest measures. A significant zero-order correlation ($p<.05$) was found for D'ROM (-.395) for posttest measures. All other correlations were found to be insignificant for all groups. D'ROM exercises have a significant effect on developing flexibility and strength at the hip joint. Increases in hip strength may not be related to increases in hip flexibility for both D'ROM exercises and static stretch.

Carol A. Kanetzke
HPER Department, Box 2820
South Dakota State University
Brookings, SD 57007

Saturday, April 9
9:00 - 10:00 a.m.

EFFECTS OF INCREASES IN BODY WEIGHT ON SPEED, POWER AND STRENGTH PERFORMANCES OF COLLEGE FOOTBALL PLAYERS. Jack K. Nelson, Louisiana State University; John Tew, Louisiana State University.

College football coaches and trainers deliberately strive to increase size and strength of their players. Many players are recruited on the assumption that they will become heavier during their playing careers. While maturation plays a part in some cases, weight training and diet are the main means of increasing weight. Obviously, the coaches intend that the increased size will be accompanied by improved performance. However, it may be that the increases in size are counterproductive to the players' speed, power and relative strength, especially when the weight gain is accomplished in a relatively short time. From a pool of 80 football players from a Division 1A university, players (n=20) who had gained a minimum of 4.5% of their original body weight in one calendar year were selected for study. Weight increases ranged from 4.5% to 11.7%. The average gain was 13.6 lbs (6.2 kg), ranging from 9 to 30 lbs (4.5-13.6 kg). The players were measured before and after the 1-yr period on % fat, lean body weight (LBW), fat weight (FW), 40 yd dash, bench press (BP), squat (Sq), strength per lb (by the Sinclair formula), the vertical jump (VJ) and the standing long jump (SLJ). Changes in performance were tested for significance by t tests. Correlations were computed between weight loss and performance changes. Among the findings were that there were significant increases in % fat, FW, LBW, BP, Sq, strength/lb and the 40 yd dash speed. No significant changes occurred in either the VJ or SLJ. Correlations between gains in wt, % fat, FW, and LBW with performance variables were low. The largest r was between LBW and Sq (r=.41). It was concluded that increased weight through the football conditioning program was accompanied by increased strength and speed with no loss in power.

Jack K. Nelson
School of HPERD
Louisiana State University
Baton Rouge, LA 70803

Saturday, April 9
9:00 - 10:00 a.m.

ANAEROBIC THRESHOLD AS A PREDICTOR OF MAXIMAL OXYGEN UPTAKE.

Julie Priday, Kathleen M. Knutzen, Leanne Lyon, Robert J. Moffatt, Department of Physical Education, Western Washington University, Bellingham, Washington 98225.

The purpose of the present investigation was to evaluate the use of anaerobic threshold as predictor of maximal oxygen uptake. Fourteen females and 15 males, aged 33-49, were administered a step-wise incremented treadmill test (Kattus protocal) to measure submaximal and maximal values of metabolic variables. Three activity levels were represented in the test population. Expired gas values were recorded and analyzed every 30 seconds by a Beckman OM11 O_2 analyzer and LB2 CO_2 analyzer contained within a Beckman Metabolic Measurement Cart. Computer software routines were written to locate aerobic and anaerobic thresholds determined by the first and second departure from linearity in the V_E time rate curve, respectively. Mean values for maximal oxygen uptake, maximum heart rate, aerobic threshold, and anaerobic threshold were 43.85 $ml/kg^{-1}/min^{-1}$ (+ 9.4), 190.1 beats/min (+ 6.95), 24.24 $ml/kg^{-1}/min^{-1}$ (+ 6.3), and 32.03 $ml/kg^{-1}/min^{-1}$ (+ 8.8), respectively. The aerobic threshold occurred at 54 percent (+ 6.6) of VO_2 max. The anaerobic threshold occurred at 71.4 percent (+ 4.03) of VO_2 max. Six submaximal variables were entered into a stepwise multiple regression analysis to predict maximal oxygen uptake. The regression equation was VO_2 max ($ml/kg^{-1}/min^{-1}$) = 12.24 + .9868 (VO_2-Anaerobic threshold). The standard error of estimate (Syx) was + 3.8234 $ml/kg^{-1}/min^{-1}$. The correlation coefficient of .918 was found to be significant ($P < 0.001$). It was concluded that anaerobic threshold was the best predictor of maximal oxygen uptake and could serve as a valid contributor to estimations of maximal values in individuals of high risk who should not be exercising at high metabolic acidosis conditions.

Kathleen M. Knutzen, Ph.D.
Dept. of Physical Education
Western Washington University
Bellingham, WA 98225

Saturday, April 9
9:00 - 10:00 a.m.

70

MYOCARDIAL OXYGEN CONSUMPTION DURING EXERCISE WITH AND WITHOUT FACIAL COOLING. Charles E. Riggs, Dewayne J. Johnson, Robert Kilgour, The Florida State University; Larry Titlow, University of Central Arkansas.

The responses of myocardial oxygen consumption to exercise with and without facial cooling were investigated in two groups of subjects to determine if the coupled effects of cold wind and exercise would be more severe in older subjects. One group ($n = 5$) consisted of male subjects under 30 yrs of age (26 ± 1.5 yrs) while the other was composed of males over 35 yrs of age (43 ± 2.7 yrs). Each subject performed the same workbout twice, once with a 10°C wind blowing in the face at 6.5 $m \cdot sec^{-1}$ (cold test) and once without the cold wind (neutral test). The workbout consisted of pedalling a bicycle ergometer at 50 rpm in 5 min stages followed by 5 min recovery periods. The intensity of the initial stage was 0 W and was increased 25 W in each successive stage until reaching 125 W in stage 6. After 5 min at 125 W, the intensity was progressively increased until the subject achieved maximum. An estimate of myocardial oxygen consumption was calculated using measures of heart rate and systemic arterial blood pressure which were monitored continuously during exercise. As expected, the myocardial oxygen consumption rose ($p < 0.05$) continuously during exercise. Suprisingly, at each of the measurement time periods both with and without cold wind, the estimated myocardial oxygen consumption of the older subjects was lower ($p < 0.06$) than that of the younger subjects both absolutely and relatively. Also suprising was the observation that with the exception of maximum, the estimated myocardial oxygen consumption was lower at every measurement time period for both groups during the cold test relative to the neutral test. It was concluded that the coupled effects of exercise and facial cooling were not more severe for the older subjects based on changes in myocardial oxygen consumption. However, further study of the balance of oxygen supply and demand appears to be warranted based on the results of this investigation.

Saturday, April 9
9:00 - 10:00 a.m.

Charles E. Riggs
Human Performance Lab., Montgomery G.
The Florida State University
Tallahassee, FL 32306

ALTERATIONS IN FATIGUE PATTERNS AS A FUNCTION OF INTERCONTRACTION REST IN HUMAN HANDGRIP MUSCLES. David H. Clarke, Indiana University, Bloomington.

The control of muscle functions is influenced by the time permitted for recovery between contractions. The influence would be expected in the fatigue asymptotes as well as the rate constant. Subjects in this experiment were twelve male volunteers who were given four tests, each separated by at least one week. They engaged in a five-minute bout of maximal exercise of the hand-gripping muscles. The tension was two seconds in duration, and the rest interval varied between 1, 2, 3, and 4 seconds. The data were collected with a BLH SR-4 load cell and Beckman recorder. Peak tension always represented MVC for any given contraction. No significant difference existed for initial maximum strength ($F_{3, 87} = .81$, $p > .05$), but final strength differed significantly ($F_{3, 87} = 14.98$, $p < .05$) for all paired comparisons as did absolute endurance ($F_{3, 87} = 19.28$, $p < .05$). The overall relative endurance was also significant ($F_{3, 87} = 3.40$, $p < .05$); the Newman-Keuls post hoc test showed significant pair-wise differences among all conditions except between the 3-sec. and 4-sec. rest intervals. Exponential analysis of the fatigue curves revealed they all conformed to a single component equation of the form $y = ae^{-kt} + c$. The fatigue curves revealed a fairly systematic reduction in final strength; the shorter the rest interval the lower the strength. The plotting of the asymptotes resulted in a curvilinear pattern over the four test conditions. An inverse curvilinear relationship was found between relative fatigability and intercontraction rest, and a fairly linear change in the rate of fatigue, the fastest rate occurring with the shortest rest interval. It is concluded that systematically decreasing the rest interval between contractions reduces muscular strength exponentially rather than linearly, provided the duration of contraction remains constant.

David H. Clarke
Department of Physical Education
Indiana University
Bloomington, IL 47405

Saturday, April 9
9:00 - 10:00 a.m.

72

THE MECHANICAL EFFICIENCY OF SHOMEN SUBURI IN KENDO.[1] Hiroh[2] Yamamoto, Washington State University; Motoi Fukushima, Kanazawa University, Japan, Marlene Adrian, Washington State University.

The purpose of this study was to determine the mechanical efficiency of shomen suburi (swing of the Kendo stick, e.g., SHINAI in A-P plane) performed by 3 male Kendo athletes. Each subject was tested on a 16-min suburi ergometer exercise. The subjects performed shomen suburi 30 swings per min according to a metronome. External work-loads were incremented every four minutes (average increments were 11.6 N, 18.1 N and 24.5 N). These increments represented mild, moderate and heavy energy expenditures. Expired gas was collected using the Douglas bag method and gas samples were analyzed using the Scholander technique during the last minute of each work-load level increment. The external work rate and corresponding steady state energy cost were determined for each subject of shomen suburi exercise. For each subject, the $\dot{V}O_2$ for each work-load was determined and power was calculated. The energy cost with respect to power was plotted. Mechanical efficiency was calculated as the inverse of the power-energy slope. Changes in gross efficiency and work efficiency at different work rates (power) were calculated with the formula of Gaesser et al.(1975). The results indicated that efficiencies of the suburi ergometer exercise performances were 9.3-13.7%. These values are higher than those of swimming, lower than those of walking and running and similar to those of simple joint exercise such as knee-bending, cranking and rowing exercise previously obtained by others. As for mechanical efficiency of swinging exercise, this study represents the first investigation of its kind. Furthermore it presents a unique ergometer useful for determining efficiency of other swinging type movements.

[1]This study was supported by Kanazawa University Research Funds and conducted in Biomechanics Laboratory with the assistance of its members. We would like to thank Mr. Tomeji Fukushima for his considerable technical skill.

[2]Hiroh Yamamoto is a visiting professor from Kanazawa University, Japan, to Washington State University.

Saturday, April 9
9:00 - 10:00 a.m.

Hiroh Yamamoto
Dept. of Phys. Educ. for Women
Washington State University
Pullman, WA 99164-1512

STROKE EFFICIENCY OF MALE AND FEMALE PROFESSIONAL TENNIS PLAYERS.
John A. W. Baker, Southern Illinois University and E. Keith Milner, University of Illinois.

The purpose of this study was to determine if any reasonable differences existed in the successful completion of strokes used by male and female professional tennis players of world class in the course of their matches. Data were provided from 10 men's and 10 women's matches played on indoor surfaces in the United States.

The following strokes were recorded for each of the 20 matches played: (i) service, (ii) return of service, (iii) forehand and backhand groundstrokes, (iv) forehand and backhand volleys, (v) lob, and (vi) overhead. Each complete match was filmed and the number and type of stroke used was transferred to Stroke Analysis Forms. Each type of stroke had its individual form on which were recorded all points played per game, how and when each particular stroke occurred in the playing of a point, and if and how any errors, or winners were made. A total of the types of stroke played and errors made was accumulated. A percentage was calculated for successes and errors.

The findings showed that there was little difference between men's and women's singles matches in tennis of successful execution of strokes played. Serves and returns of serve were executed with approximately equal success, so were forehands cross-court and down-the-line, backhands cross-court, and high and low backhand volleys cross-court. The remaining strokes were divided almost equally between those favoring the men and those favoring the women.

John A. W. Baker
Department of Physical Education
Southern Illinois University
Carbondale, IL 62901

Saturday, April 9
9:00 - 10:00 a.m.

EVALUATION OF ELITE FLOP JUMPERS AND THEIR PERFORMANCES.

Deborah L. Gebhardt, Advanced Research Resources Organization,
Sally J. Phillips and Joseph F. Grikis, University of Maryland.

This study examined the relationship among selected temporal, anthropometric, and kinematic variables associated with two methods of performing the Fosbury flop. Cinematographic data (200 fps) were collected at the 1981 Olympic Development Camp. The five subjects had all cleared seven feet during the competitive season. The subjects were classified as speed and power jumpers based on differences in plant time [from final foot touch down (TD) to takeoff (TO)]. The mean plant times were 178 and 238 ms, respectively. The magnitude of the jumpers' incoming horizontal velocity at TD was found to be greater for the speed jumpers ($\bar{x}$=7.22m·s^{-1}) than for the power jumpers ($\bar{x}$=6.28m·s^{-1}). At TO, the speed jumpers' vertical velocity component was larger than the horizontal component. The power jumpers' TO horizontal component was either larger or almost equal to the vertical component. On the average, speed jumpers had a relatively longer shank than power jumpers when shank length was expressed as a percentage of lower limb length. The final stride length, expressed as a percentage of height, ranged from 63% to 121% with no clear difference between speed and power jumpers. The angle of the knee ($\bar{x}$=166°) at TD was found to be similar across subjects, but the jumpers who cleared the greatest height demonstrated a backward lean of the trunk. Finally, the time from TD to a position in which the thighs were parallel was found to be consistent ($\bar{x}$=77ms). These data and the jumpers' personal records were compared to the results of a battery of physical performance measures (vertical, long, and triple jump, double-hop-step jump, and 40 yard dash). The results of these comparisons showed no conclusive evidence that any of these measures were related to differences in high jump performance. It was concluded that there were several physical and biomechanical parameters that distinguished between speed and power jumpers. However, both methods shared several common elements.

Deborah L. Gebhardt
Advanced Research Resources Org.
4330 East-West Highway, Suite 900
Washington, DC 20814

Saturday, April 9
9:00 - 10:00 a.m.

FROM INACTIVITY TO MARATHONS: MOTIVATIONS AND SELF-PERCEPTIONS OF MIDDLE-AGED DISTANCE RUNNERS. Jonathan Nelson, Northern Michigan University.

PURPOSE. The purpose of the study was to determine: 1) the factors and circumstances which were responsible for motivating a selected group of middle-age men to change from a sedentary to a physically active life-style; 2) the significance of and effects of endurance training; and 3) the cognitive strategies employed by non-elite distance runners. RATIONALE. Only limited research has been done to identify the recent surge of interest in marathon running. Furthermore, research studies have dealt mainly with the elite marathon runner while neglecting the non-elite marathon runner. SUBJECTS AND PROCEDURES. Fifteen marathon runners (male) from the Upper Peninsula of Michigan were selected for this study. Volunteers were solicited utilizing the following selection criteria; 1) must have reached the age of 40; 2) must have been physically inactive in adult years prior to starting endurance training; and 3) must have participated in at least one marathon in the past year. Using a case study approach, the researcher collected data through personal interviews. A 1½-hour tape-recorded interview was conducted with each subject using a series of structured questions that focused on the specific objectives of the study. Collected data was descriptively analyzed and comparisons were made between individual responses and with data reported in the literature. RESULTS. For all subjects a combination of factors was responsible for motivating them to begin running. Common factors were: death of a friend or parent, lack of energy and frequent fatigue, uneasiness about body image, and Cooper's book Aerobics. All subjects agreed that the reason they did not start running sooner in life was because they were not aware of the meaning of physical fitness and its benefits. The physiological effects of running included: an average weight loss of 32 pounds per person; high blood pressures reduced to normal, fewer ailments like colds, backaches and headaches. The significance and psychological effects of running were: physical and mental well-being, improved self-image, sense of freedom, opportunity for goal achievement and the development of a close bond of friendship with other runners. This group of non-elite marathon runners all used the cognitive strategy of "association" when running a marathon, which contrasts with the reports in the literature which indicate that non-elite runners dissociate.

Jonathan Nelson
Department of HPER
Northern Michigan University
Marquette, MI 49855

Saturday, April 9
11:00 - 12:00 p.m.

THE RELATIONSHIP BETWEEN SEX, SEX ROLE AND COMPETITIVE TRAIT ANXIETY. Jan D. Segal and Robert S. Weinberg, North Texas State University.

Wark and Wittig (1979) conducted the first study specifically designed to test the relationship between sex roles and competitive trait anxiety (CTA) using the Bem Sex Role Inventory (BSRI, Bem, 1974) and the Sport Competition Anxiety Test (SCAT), Martens, 1977). Results indicated that masculine males received lower SCAT scores than feminine females. However, since they only included two of the eight possible sex by sex role combinations (i.e., masculine males and feminine females), it was impossible to determine the relative contribution of sex and sex role to the differential SCAT findings. Thus, the purpose of the present investigation was to provide a more definitive assessment of the relationship between sex, sex role and CTA. Subjects were 166 females and 125 male undergraduates at North Texas State University. All subjects completed the BSRI and the SCAT with the order of administration of these two scales counter balanced. Results indicated no significant order effect and, therefore, a 2x4 (sex by sex role) ANOVA was conducted with SCAT serving as the dependent measure. Results yielded a main effect for sex with females exhibiting significantly higher levels of CTA than males. However, the main effect for sex role and the sex by sex role interaction did not reach significance. Even when frequency, competitiveness and personal importance of participation in competitive sports were held constant, a significant main effect for sex was still evident. Thus Wark and Wittig's results seem to be reflecting a sex effect rather than any sex role variation. The finding that females exhibit higher levels of CTA than males is consonant with previous literature [illegible]y reflect a difference in socialization into competitive [illegible]. The lack of sex role findings might be due to the fact [illegible]l sex role inventories are still basically in the formative [illegible]ages and thus may require further refinements to establish adequate reliability and validity. Future directions for research are offered including a closer examination of the socialization processes impacting on the development of males and females in competitive sport environments.

Robert S. Weinberg
Dept. of Physical Education
North Texas State University
Denton, TX 76203

Saturday, April 9
11:00 - 12:00 p.m.

ATTITUDES OF FEMALE COLLEGIATE BASKETBALL PLAYERS TOWARD VARIOUS ASPECTS OF THEIR PARTICIPATION. Donald Siegel, Smith College; Caryl Newhof, Smith College.

The purpose of this study was to determine how individuals participating in different AIAW basketball divisions viewed a constellation of sport related concepts. These were presented to 258 subjects in a semantic differential format. Data for each concept were analyzed for reliability and then subjected to factor analysis. Three factors (i.e., Intrinsic Satisfaction, Mastery Over Others, and Social Pressures to Participate), accounting for 48.3% of the response variance, were extracted from the data. Factor scores were then generated for each subject and entered into MANOVA for the purpose of determining whether differences existed among athletes in Division I, II, and III. Group centroids differed at $p = .075$. Subsequent step-down F tests utilizing the Roy-Bargmon technique demonstrated that the primary reason for group disparity was a result of Division I athletes being more favorably disposed toward Mastery Over Others than individuals in either of the other two divisions. Group differences were not revealed for Intrinsic Satisfaction or Social Pressures to Participate. A final analysis revealed that across all divisions concepts related to Intrinsic Satisfaction were viewed most favorably, those having to do with Mastery Over Others next, and those concerned with the Social Pressures to Participate were viewed least favorably.

Donald Siegel
Dept. of Exercise & Sport Studies
Smith College
Northampton, MA 01063

Saturday, April 9
11:00 - 12:00 p.m.

AN INVESTIGATION OF THE SOCIALIZATION PROCESS OF FEMALE BASKETBALL PLAYERS. Joan M. Campbell, Bemidji State University; March L. Krotee, University of Minnesota.

The purpose of the investigation was to add to the body of knowledge concerning the socialization of female athletes. In order to study the processes by which individuals learn to play various social roles necessary for effective participation in society, the Minnesota Demographic Questionnaire K-C Form was administered to (n=182) female athletes ranging in age and categorized from 10-14 and 14-18. The questionnaire consisted of 60 items designed to ascertain various socialization processes such as family and significant other involvement, parental expectation, level of athlete aspiration, attitude and achievement. The results of the investigation yielded the following concerning the 182 female athletes involved in the study: 1) the subjects were high (above 3.0) in academic achievement, 2) the athletes engaged in other appropriate school activities (87%), 3) the parental and significant other level were supportive, positive and significantly dynamic. The father's role, however, was significantly different from the other primary caretaker. 4) The siblings of the athletes were found to be active (males 91% and females 87%), 5) the athletes level of aspiration, goal setting, attitude and evaluation of the self was found to be healthy and altering in a positive fashion.

Dr. March L. Krotee, 218 Cooke Hall
University of Minnesota
Minneapolis, MN 55455

Saturday, April 9
11:00 - 12:00 p.m.

ATTITUDES AND BELIEFS OF PARTICIPANTS IN A YOUTH SPORTS BASKETBALL PROGRAM. Glenn Potter and Thomas Wandzilak, University of Nebraska-Lincoln.

The purpose of this study was to determine the effects of a values oriented undergraduate coaching endorsement program on the attitudes and beliefs of participants in a youth sports basketball program. Participants (n = 96) in the "Spirit of '76" basketball league, ages 12-14 years, were asked to complete an 18-item survey form before and after the 1978-79 season. The players were coached by college-age volunteers from a basketball theory course and individuals affiliated with various sponsors. Results of the survey revealed that the number of supporters for the concepts of fair play, sportsmanship, honesty and fun had decreased from the beginning of the season, suggesting a need for a critical examination of the program. As a result of this study it was decided that all future coaches in the league be enrolled in a coaching endorsement program where values would be emphasized. Participants (n = 112) in the 1981-82 basketball season were surveyed in the same manner as the 1978-79 group. Chi-square analyses revealed that the values oriented instruction received by the coaches affected the attitudes and beliefs of the 1981-82 participants. When comparing the response patterns for the pre-season and post-season 1981-82 participants, results confirmed, in nearly all cases, that values were being maintained which was in contrast to results of the previous study. It was concluded that the "Spirit of '76" league is providing a better quality experience for its participants than previously. The coaching endorsement programs seems to be an instrumental factor in this change.

Thomas Wandzilak
School of HPER
University of Nebraska-Lincoln
Lincoln, NE 68588

Saturday, April 9
11:00 - 12:00 p.m.

AFFECTIVE PREDICTORS OF MOTOR PROFICIENCY IN ELEMENTARY SCHOOL CHILDREN. Lisa M. Rini, San Diego State University.

Research in the affective domain and its relationship to psychomotor proficiency in children has yielded varying degrees of usefulness for the physical education practitioner. The purpose of this study was to determine if selected affective variables alone or in combination assist in predicting the motor proficiency of elementary school children. These affective variables included: attitude towards physical activity, global self-concept, locus of control, sociometric status, and participation/involvement in physical activity. The Rini Attitude Scale for Physical Education Activities, Martinek-Zaichkowsky Self-Concept Scale for Children, Children's Locus-of-Control Scale, L-J Sociometric Technique, and the Bruininks-Oseretsky Test of Motor Proficiency were administered to 269 children between the ages of six to thirteen. The consent form contained a description of the participation/involvement of each child and was signed by the parent prior to the testing. Both age-group and sex differences were determined. Developmental trends occurred as expected. Motor proficiency, internality (locus of control), and participation/involvement increased significantly with age. Self-concept and attitude towards physical activity decreased significantly with age. A two-way analysis of variance for group and sex yielded significant sex differences for attitude toward physical activity and self-concept. No significant interaction effects were found. The affective variables entered into the prediction equation for motor proficiency with the following multiple correlation coefficients: step 1, sociometric status, $r = .367$; step 2, participation/involvement, $r = .436$; step 3, attitude towards physical activity, $r = .454$; step 4, locus of control, $r = .472$; and step 5, self-concept, $r = .473$. The results of this study suggest it may be desirable to systematically develop and prioritize instructional objectives in the affective domain within the physical education curriculum. Without such structure, selected affective behaviors show no improvement. In addition, the enhancement of the sociometric status of children clearly warrants further consideration.

Lisa M. Rini, Ph.D.
San Diego State University
Physical Education Department
San Diego, CA 92182-0171

Saturday, April 9
11:00 - 12:00 p.m.

A COMPARISON OF PHYSICAL FITNESS SCORES OF MEXICAN-AMERICAN CHILDREN IN A SOUTHERN CALIFORNIA ELEMENTARY SCHOOL TO THE AAHPER YOUTH FITNESS TEST NORMS. Ginger McManus, San Diego Unified Schools; Peter M. Aufsesser, San Diego State University.

The following research investigated two distinct areas of physical fitness. The first area compared Mexican-American children's test scores to the national norms for performance on the American Association for Health, Physical Education and Recreation Youth Fitness Test, ages 10 to 12. The comparison was divided into three areas: a) the chronological age differences (10-12) for the boys, b) the chronological age differences (10-12) for the girls, and c) the gender differences for each grade level for each battery test item of the AAHPER test. The second area was to determine if there was a significant difference which would constitute developing a special physical education program for the Mexican-American children. The sample was 216 Mexican-American subjects selected randomly from a major Southern California elementary school. The AAHPER test was utilized because of its proven validity in evaluating the fitness levels of students. The test was administered to the children by a physical educator and qualified teachers. The analysis of data was programmed to compare the Mexican-American children's scores to the National Norms of the AAHPER Youth Fitness Test. For each test item, the mean, standard deviation, and percentiles were calculated and an analysis of variance was applied to the dependent variables with the significance level set at .05. The results indicated differences with the national norms, but did not indicate a significant interaction between sex and age, therefore an unweighted means of variance was performed. All of the test items, except one (600 yard run) had significant sex and age effects. In general, performance increased with age and the boys performed, on the average, better than the girls. For the 600 yard run, there was a significant disparity between males and females, but not a significant change with age. No test item showed a significant sex interaction. This indicated that the improved performance across age was not significantly different for the girls and boys (i.e., they both improved at approximately the same rate). In conclusion, this study indicated a poorer performance by the Mexican-American boys and girls in comparison to the national norms, but not to the degree that would indicate the need to develop a special physical education program. More research needs to be conducted in order to determine physical fitness of other Mexican Americans in minority elementary schools in Southern California.

Peter M. Aufsesser, Coordinator
Adapted Physical Education
San Diego State University
San Diego, CA 92182

Saturday, April 9
11:00 - 12:00 p.m.

NONTRADITIONAL GAMES IN A FOREIGN ENVIRONMENT. TOM CROSS, UNIVERSITY OF OKLAHOMA.

The purpose of this study was to determine the value of nontraditional games as an alternative to the traditional public school physical education curriculum.

Interest in sport results from a frequent association in that environment. The lack of exposure and/or role models creates difficulty in developing an appreciation for another culture's games. Motivating interest in a competitive activity that is foreign to the participant's traditional play requires execution of a specific program of instruction.

Male and female seventh grade students living in a country environment, one site found in Victoria, Australia, the second site located in the state of California, were introduced to games associated with the culture of other countries. "Midget" hockey, a form of Canadian ice hockey, was taught to the children in Australia. Having a climate conducive to outdoor activity, the children experienced a nontraditional game which lent itself to a small indoor area of the school gymnasium. "Box" cricket, a form of English cricket, was taught to the children living in California. With this game, children discovered that one individual could compete against many and have a fair opportunity for success. Although students at both locations participated in the respective activities for a period of five (5) weeks, only the Australian contingent showed continued interest and participation beyond the instructional period.

Youth preference in games would appear to be effected by the meaning applied to sport by that culture. In Australia a great many people participate in amateur sport. In America the youth are deluged with the professional play of the traditional games. The latter fined the traditional sports as the accepted manner of achievement and recognition while the youth of Australia appear to be open and receptive to all forms of play.

The integration of nontraditional games should be considered as a means of familiarizing children with alternative forms of competition. These games provide a prospective for advancing the cooperation and understanding between people of various cultures.

THOMAS S. CROSS, INSTRUCTOR
DEPT. OF HEALTH, PHYSICAL ED., REC.
UNIV. OF OKLAHOMA, NORMAN, OK 73019

Saturday, April 9
11:00 - 12:00 p.m.

STUDENT EXPECTATIONS FOR ACADEMIC PERFORMANCE. Joseph A. Benson, University of Wyoming.

The purpose of this study was to examine the generally reported finding that boys will begin a new school year with higher expectations for academic performance than girls due to differences in attributions for past performance. Subjects utilized in this investigation were 483 public school students enrolled in fourth, sixth, eighth, or tenth grade during fall semester, 1982. Students, expectations for academic performance were assessed during the first week of school. Three measures of expectancy were attained: overall or general expectancy, expectancies specific to subject areas and expectancies for performance relative to classmates. Analysis of the results, using a multi-variate F, determined if significant differences existed between boys and girls expectations for academic performance. Academic areas used as variables for comparison were English, Math, Physical Education, Social Studies, and Science. A discriminant analysis was then conducted to further determine the source of significant differences. Results indicated significant differences existed between boys and girls expectations for performance in 3 subject areas. Girls indicated higher expectations than boys for their academic performance in English ($P < .05$). Boys demonstrated higher expectations than girls for academic performance in Physical Education ($P < .01$) and Science ($P < .01$). In comparing their expected performance in classes to that of their classmates boys indicated higher expectations than girls for their performance in Physical Education ($P < .01$) and in Science ($P < .01$). Discriminant analysis of subjects' expectations by grade level revealed significant differences between boys' and girls' expectations for performance in science and physical education were primarily accounted for by the responses of eighth grade students. Results suggest that sex differentiation in expectations for academic performance may be subject and grade specific.

Dr. Joseph A. Benson
Department of Physical Education
University of Wyoming
Laramie, WY 82071

Saturday, April 9
11:00 - 12:00 p.m.

THE ACCURACY OF SELECTED SCHOOL PERSONNEL'S ESTIMATE OF COMMUNITY SUPPORT FOR SCHOOL SEX EDUCATION. William L. Yarber, Purdue University; Kellie Slate-Pavese, Techumseh Area Planned Parenthood, Lafayette, Indiana.

Community support for school sex education is a major criterion used by school personnel in determining the nature of a sex education curriculum. The school personnel estimate the level of community support on the presumption that they can accurately perceive community attitudes toward sex education. This study determined the accuracy of the estimates of community support for school sex education by school board members and secondary school administrators and health teachers. Subjects were limited to 200 adults of an Indiana city and 4 school board members, 14 administrators, and 14 health teachers of the city school corporation. Data were collected by a random telephone survey of adults and personal interviews with school personnel. Major findings were: (1) For nearly all of 11 sexuality-related topics and for sex education in general, there were significant differences in the level of community support and estimated level of support by the school personnel; (2) The average community support for instruction concerning the 11 topics was 77%, with 94% favoring sex education in general; (3) School board members estimated the community support to be 41%, on the average, for the 11 topics and 62% for sex education in general; and (4) Administrators and health teachers estimated that 57%, on the average, supported the 11 topics, with 62% and 69%, respectively, believing that the community favored sex education in general. In conclusion, estimates of community support for school sex education by school board members, administrators, and health teachers were shown not to be a valid method for accurately determining the level of community endorsement. None of the school groups accurately estimated the level of community support for school sex education, with each group underestimating the support. School board members' estimates were most inaccurate. The level of community support and estimated support for each of the 11 topics will be discussed during the presentation.

William L. Yarber
Health Educ. Section - PEHRS Dept.
Purdue University
W. Lafayette, IN 47907

Saturday, April 9
2:00 - 3:00 p.m.

RANK ORDERED CHOICES OF HELP FOR HIGH SCHOOL SENIORS HAVING ALCOHOL, MARIJUANA, OR OTHER DRUG PROBLEMS. Dale B. Hahn, Ball State University, Muncie, Indiana.

The purpose of the study was to determine the sources that high school seniors would turn to for help if they had alcohol, marijuana, or other drug problems. A statewide randomly selected, stratified sample of 2325 public school seniors was asked to indicate where they might seek help for (a) themselves, and (b) their friends and relatives having drug problems. The responding students indicated that for their own drug problems, they would first seek help from (1) friends and relatives, (2) from parents, and then (3) anonymous self-help groups. The top ranked choices for helping their friends were: "to help them myself" for alcohol and marijuana problems, and "to seek a doctor or psychiatrist" for other drug problems. Interestingly, seeking help from teachers, social workers, and police were the lowest ranked sources (14th, 15th, and 16th) for help both for personal drug related problems and for friends' problems. Among the conclusions drawn were that (a) persons professionally trained to provide help were generally not perceived to be desirable choices, and (b) parents and peers play specific roles in providing help for high school seniors having drug problems.

Dale B. Hahn, PhD
Dept. of Physiology and Health Sci.
Ball State Univ., Muncie, IN

Saturday, April 9
2:00 - 3:00 p.m.

STUDENT DRUG USE AND DRIVING: A UNIVERSITY SAMPLE.
Robert Valois, Eastern Illinois University.

The problem of accidents, injuries and deaths involving drug use by motor vehicle drivers has become an increasing concern, especially in the United States. Consideration of this health problem within a university community is lacking. The major objectives of this study were to examine the frequency of student drug use shortly before or while driving a motor vehicle and to investigate the possible significance of association among drug use, driving and sociodemographic variables. An anonymous questionnaire was utilized to obtain the information from a sample of 3.2% of the student population at a midwestern university. Data were collected for 857 drivers, 477 females and 380 males. Frequency distributions were recorded for each of the 36 variables. Crosstabulation was employed in the final analysis to aid in the identification of significant associations between designated variables. Results of this study indicate that campus drug use and driving is comparable to national trends and similar studies. Chi-square analysis identified significant associations ($p < .001$) between alcohol use, shortly before or while driving and the variables of moving violations, accidents, age, sex, driving experience in years and class rank. A significant association ($p < .001$) seems to exist between driving under the effects of marijuana and the variables of sex, number of miles driven per year and the frequency of driving. Crosstabulation found a significant association ($p < .001$) between nicotine use and class rank, age, and motor vehicle accidents for those who use this substance and drive. Narcotic use as well as LSD, chemical vapors, cocaine and barbiturates do not appear to be major factors in relationship to exposure of substance use shortly before or while driving in a University community. Health educators in college and community settings may implicate these results for program planning, and evaluation purposes.

Robert F. Valois
Department of Health Education
Eastern Illinois University
Charleston, IL

Saturday, April 9
2:00 - 3:00 p.m.

AN INVESTIGATION INTO TEN SPECIFIC AREAS OF PHYSICAL EDUCATION PROGRAMS IN SELECTED COLLEGES AND UNIVERSITIES -- REVISITED.

Dr. William F. Stier, Jr., Ohio Northern University, Ada, Ohio.

This investigation was conducted as a follow-up to a previous national study conducted by the researcher in 1971. The scope of this study included an examination of ten areas within undergraduate physical education programs in colleges and universities within the continental United States. These ten areas included (1) general characteristics of the institutions, (2) professional preparation programs and sequence of courses, (3) characteristics of students within the institutions and within the departments of physical education, (4) role(s) of the faculty/administration within physical education, (5) activity/service programs and activities, (6) athletic programs, (7) intramural programs, (8) extramural and club sport programs, (9) facilities (on and off campus), and (10) office management and organization. This investigation, concluded in 1982, sought not only to ascertain the present status of physical education programs and activities on college campuses, but also to determine and compare the changes (if any) which had occured within the past ten years since the conclusion and publication of the 1971 national investigation. The 1971 research instrument was reviewed and revised resulting in a new eleven page questionnaire. This survey instrument was mailed to 220 randomly selected four year institutions with a specific student population range. The response generated through this mailing included 144 useable instruments for a 65% rate of return. Conclusions: (1) there have been varied and significant changes in many aspects of the undergraduate physical education programs since the 1971 investigation, both in terms of offerings provided and in the administrative policies within the departments, (2) there is a definite trend towards a more pragmatic approach towards teacher preparation, especially in the areas of increased field experiences and earlier student teaching exposure, (3) there is earlier professional involvement today by future physical educators, (4) intramural participation has seen an increase by both men and women, (5) physical education faculty consider themselves better prepared and better educated than their 1971 counterparts, (6) facilities have improved in terms of quality and quantity, (7) the present state of physical education programs reflect more unique and radically innovative measures and practices in contrast with earlier research findings. These innovative measures and practices are evident throughout the ten areas included within the scope of this national investigation.

Dr. William F. Stier, Jr.
Chairperson & Professor - HPE
Ohio Northern University (Ada, OH)

Saturday, April 9
2:00 - 3:00 p.m.

THE DEVELOPMENT OF AN EMPIRICAL BASED CURRICULUM FOR ASPIRING HIGHER EDUCATION PHYSICAL EDUCATION ADMINISTRATORS. Arthur W. Miller, Idaho State University; John A. Gustafson, University of New Mexico.

The purpose of the study was to provide colleges and universities with an empirical based curriculum for the study of higher education administration in physical education. The data collection instrument was a validated questionnaire sent to 136 administrators in higher education physical education. Administrators were requested to rate (1) their level of competence in stated coursework and (2) the level of importance of stated coursework in reference to their present position. Administrators were also requested to rate (3) their level of preparation for selected duties (POSDCORB) and (4) the level of importance of selected duties (POSDCORB) inherent to their position. The 106 responses were divided into three categories dependent on the institution's level(s) of degree offered: Group A, Bachelors Degree only; Group B, Bachelors and Masters; and Group C, Bachelors, Masters and Doctorate. The 106 responses revealed that administrators have a high competence in physical education type coursework and a low competence in non-physical education type coursework (business, writing, speaking, communications), but assigned a low rating for the importance of physical education coursework and a high rating for the importance of non-physical education type coursework. Selected duty preparation received a low rating while duty importance received a high rating. These results indicate administrators feel they are ill prepared to assume their role and duties in higher education. An empirical based curriculum for aspiring higher education physical education administrators was proposed to alleviate this situation. The ten coursework areas are:

1) Leadership Skills	(4.50)	6) Staffing	(4.08)
2) Personnel Management	(4.36)	7) Problem Analysis	(4.03)
3) Public Speaking	(4.26)	8) Administration of PE	(3.89)
4) Public Relations	(4.11)	9) PE Facility Planning	(3.84)
5) Budgeting	(4.10)	10) HPER Supervision Skills	(3.70)

Five supplementary coursework areas were also recommended for each of the three Groups to fulfill each individual need.

Arthur William Miller
Dept. of Health and Physical Education
Idaho State University
Pocatello, I[illegible] 83209

Saturday, April 9
2:00 - 3:00 p.m.

ATTITUDE CHANGE AS AFFECTED BY VIEWING A FILM ABOUT ABORTION: A PILOT STUDY. Margaret M. Smith, Oregon State University.

The purposes of this study were: (1) to determine whether viewing the film "New Liberty: A Matter of Choice" altered attitudes toward abortion; (2) to measure the direction and degree of any changed attitudes; and (3) to assess whether any changed attitudes held over time. This research was prompted by the fact that a local "Right to Life" group had repeatedly requested that the film become part of the public school instructional program. Group members believe the film to be a very persuasive tool in developing negative attitudes toward abortion. Since health educators and administrators lacked reliable data to support or refute this contention, or to determine the film's educational value, a pilot study was conducted. The research design consisted of a pre, post, and post-post treatment modality. The Abortion Attitude Scale consisting of thirty statements about abortion, was utilized to determine each subject's positive (in favor) or negative (against) attitude toward abortion. Previous research has shown the scale to have a reliability coefficient of 0.91. The study group consisted of two sub-samples: nineteen high school students enrolled in a sophomore level health education class and twenty-five prospective health education teachers in a graduate-level sex education class. The scale was administered on three separate occasions--before, after, and four weeks after viewing the film. A paired t-test was used for statistical analysis. Results indicated that: (1) the film did alter attitudes; (2) attitudes after viewing the film tended to be in the direction of less favorable toward abortion; and (3) attitudes that did change did not persist over a period of four weeks. The results of this pilot study indicated that attitudes toward abortion can be changed but that such changes are only temporary. Therefore, the film "New Liberty: A Matter of Choice" does not appear to be an effective tool in permanently changing attitudes toward abortion. Further research may be warranted.

Margaret M. Smith
Department of Health
Oregon State University
Corvallis, OR 97331

Saturday, April 9
2:00 - 3:00 p.m.

9J

AN EIGHT-YEAR STUDY OF SELECTED CHARACTERISTICS OF COOPERATING TEACHERS AS EVALUATED BY STUDENT TEACHERS. John M. Chevrette, Texas A&M University.

The purpose of this study was to summarize the evaluations of cooperating teachers in charge of student teachers for the academic years 1973-1981. The evaluation consisted of a Likert-type scale rating of selected characteristics of the teachers working with student teachers from the Department of Health and Physical Education at Texas A&M University. A total of 728 evaluations were examined as they were completed by 546 student teachers located in 12 separate independent school districts. Ninety eight different schools ranging from the elementary level through high school were utilized. The evaluations were completed after student teaching was terminated and the students had returned to the campus for debriefing. Student teachers who had had two cooperating teachers because they were teaching at both the elementary and secondary level were asked to complete an evaluation for each teacher. Some of the results revealed that 86% of the teachers were rated excellent in creating an atmosphere of friendliness and acceptance. Only 51% of the cooperating teachers were rated as providing excellent assistance in obtaining and using new and supplementary materials while 13% of the cooperating teachers were rated poorly as far as encouraging self-evaluation. On the basis of the results, it was concluded that generally cooperating teachers were strong in the area of orientation to the school environment, creating an atmosphere of acceptance and friendliness and in assisting the student teacher in achieving realistic teaching experiences. Other conclusions were that cooperating teachers were not as strong in providing basic instructional materials, encouraging self-evaluation, assisting in setting up levels of achievement for the student teacher, and encouraging professional growth. The study's educational importance lies in the fact that it was conducted over a period of 16 consecutive semesters. The implications for planning future in-service programs for teachers on the basis of this study are self-evident.

John M. Chevrette
Dept. of Health & Physical Education
Texas A&M University
College Station, TX 77843

Saturday, April 9
2:00 - 3:00 p.m.

MANAGEMENT OF MISBEHAVIOR IN COMPETITIVE SWIM PRACTICE. E. William Vogler and Dale P. Mood, University of Colorado.

Applied behavior analysis techniques for purposes of performance motivation and behavioral intervention have seldomly been utilized in sport settings. The purpose of this study was to demonstrate the effectiveness of a group-oriented peer behavioral contingency in managing misbehaviors in a competitive swim practice setting. Ninety five competitive swimmers served as subjects which were divided into the following age groups: (a) younger: ages 6-8 years(n = 20), (b)middle: ages 9-12 years(n = 40), and (c) older: ages 13-18 years(n = 35). A reversal A-B-A-B design was used in which subjects were reinforced as a group with leaving practice early at predetermined increments of time for observing team rules effectively. Target behaviors were defined and observed over a 27-day period. They included personal-social behaviors which were listening while coach was talking and following directions and swimming-practice behaviors which were getting to practice on time, swimming the correct stroke, and no stopping/walking on the bottom. The contingency significantly reduced the average misbehaviors/day/group for the older group(88.0 to 20.6) and middle group(72.3 to 40.7) but not for the younger group(25.4 to 18.6). The results seem to follow an expected trend. Middle and older groups of swimmers who relate more favorably to their peers responded positively to treatment. Younger groups of swimmers who relate more favorably to adults and authority figures did not respond positively to treatment. It can be concluded that group contingency behavioral management programs are indicated for children inovlved in competitive swimming programs but not for those below a certain level in age.

E. William Vogler
Department of Physical Education
U. Colorado, Boulder, CO 80309

Saturday, April 9
2:00 - 3:00 p.m.

THE EFFECTS OF AN INSERVICE MODEL FOR REGULAR PHYSICAL EDUCATORS WORKING WITH HANDICAPPED STUDENTS IN THE MAINSTREAM SETTING.
TERRY Y. JACKSON. UNIVERSITY OF GEORGIA.

The purpose of this study was to investigate the effectiveness of an individualized inservice intervention model in modifying the understandings and training desires of regular physical education teachers working with handicapped students in the mainstream setting. Eight elementary school physical education teachers were randomly selected and placed within three experimental groups and one control group. There were two teachers per group. All groups participated in the pre-test, the post-test, and a follow-up interview. Experimental Group I participated in one intervention, Group II participated in two interventions, and Group III in three interventions. An instrument was developed which would indicate priority content areas for inservice training as well as indicate any change in those priorities at the completion of the inservice training. All teachers in the experimental groups increased in understandings in content areas covered during interventions, but not in direct proportion to the number of individualized interventions, therefore the hypothesis that the greater the amount of individualized intervention the greater the increase in the understandings level of teachers was rejected. All teachers experienced a decrease in training desires on some of the items on the assessment instrument, however this was not in direct proportion to the number of individualized interventions, therefore the hypothesis that the greater the amount of individualized intervention the greater the decrease in training desires was rejected. It was concluded that the increase in understandings and the decrease in training desires indicated the inservice model was effective. From the interview it was concluded that the individual intervention was the most helpful aspect of the inservice education model. It is recommended that the need for inservice preparation of regular physical education teachers to work with handicapped students in the mainstream setting be approached through the development of an individual inservice education model planned for the local school system. Based on information in the follow-up interview, it is recommended that two intervention phases per teacher would be relevant. Recommendations for further study will be displayed.

Terry Y. Jackson
Dept. of P.E., Univ. of Georgia
Athens, GA 30602

Saturday, April 9
2:00 - 3:00 p.m.

THE ROLE OF CAMPING PRACTICES UPON THE RECREATION MOTIVATIONS OF URBAN CAMPGROUND USERS. J. Thomas Chesnutt, The University of Alabama; Thomas J. Wood, University of Minnesota, Duluth.

Rising transportation costs and the struggling economy are causing an increasing number of individuals to seek to satisfy their recreation desires, including camping, closer to home. The purpose of this study was to examine the reasons individuals engaged in camping activities in an urban campground and to determine if motivational differences existed based upon camping practices. Questionnaires were distributed to 588 camping parties at an urban campground in the upper midwest, and 322 were returned for a response rate of 54.8%. The questionnaires were used to obtain demographic data, camping preferences and practices and motivations for camping. The Psychological Outcomes of Recreation Participation Scale developed by Driver and Brown was administered to measure the motivations of the subjects in the areas of achievement, escape of personal-social pressures, escape of physical pressures, general learning, leadership/autonomy, and risk taking. On the questionnaire subjects were asked to rate how accurate statements relating to recreation outcomes were for them based on a six point Likert scale. Results indicated that urban campground users participated in camping primarily to escape personal-social problems, and they were least likely to engage in their camping activities to seek achievement. Three way analysis of variance and Bonferroni multiple comparison procedures were applied to examine the effects of demographic variables, camping practices, and their interactions upon recreation motivators. Significant differences were found among groups based on income, camping style, camping frequency, and group composition. The most consistent finding was with camping style, where urban campers who utilized mobile homes were more likely to go camping for the benefits of achievement, escape of personal-social pressures, and escape of physical pressures than were those camping in campers. Five interactions were also significant. The results, which indicated definite differences existed as to why individuals used the urban campground, have implications for urban campground managers who desire to target specific segments of the camping market.

J. Thomas Chesnutt
Department of HPER
University of Alabama
University, AL 35486

Saturday, April 9
2:00 - 3:00 p.m.

Thermal Variation and Tactile Discrimination In The Dominant Hand. By John T. Strandring, Northeastern Illinois University and C. Eric Gronbech, Professor, Chicago State University.

Participants required to manipulate implements or objects have long been aware of the affect thermal variation has on the ability to differentiate between tactile stimuli. Football, baseball, golf and tennis are but a few activities which require "A feel" to perform successfully and in which players are subject to environmental temperature change. Many commercial items are available which have been designed to combat the affect of temperature variation, yet no evidence that this affect has ever been scientifically investigated seems to exist. It was the purpose of this study to ascertain what effect, if any, exposure to different temperatures would have on an individuals ability to discriminate between different tactile stimuli. Ten young adult males were repeatedly subjected to emersion of their dominant hand in water ranging in temperature from ice to 105^{o}F, in increments of 15 ^{o}F, and then asked to identify 40 two-dimensional figures without the availability of sight. The figures were cut out of different grades of sandpaper and embedded in a single course grade. The difference in stimuli varied from none to very great. Each subject was tested for identification of four figures on ten cards assigned at random, equally inclusive of all testing possibilities. Five seconds were alloted in which to identify each figure. Testing followed five minutes of dominant hand immersion, a treatment which was repeated for two minutes after the first five cards. All treatment temperatures were assigned at random. The results of the study indicated that the ability to accurately discriminate between different degrees of tactile stimuli was facilitated by temperatures above 60^{o}F, and adversely affected by temperatures below 60^{o}F. Specific comparisons and the overall trend (presented graphically) are available.

Dr. C. Eric Gronbech, Professor
Chicago State University, HPER&A
95th St. at King Drive,
Chicago, IL 60628

Saturday, April 9
3:30 - 4:30 p.m.

AN EXAMINATION OF THE SOUTHERN CALIFORNIA PERCEPTUAL MOTOR TESTS.
Wendell Liemohn, University of Tennessee and Dennis Knapczyk, Indiana University.

Although the Southern California Perceptual Motor Tests (SCPMT) are widely used, research on these tests is essentially limited to that of their developer. In reviews published in both of the most recent MENTAL MEASUREMENTS YEARBOOKS (Buros, 1972, 1978), the theoretical and statistical basis of the SCPMT, and/or the series from which it emanates, were questioned. Despite these reviews its use is widespread; moreover it has also been cited for possible use as a motor assessment instrument in three recent textbooks in adapted physical education. Because of the (a) dearth of statistical research done on the SCPMT and (b) impact that its administration can have on the development of the IEP, it would appear that a critical statistical analysis of the tests is warranted. The purpose of this investigation was to examine performance on the SCPMT by using correlation and factor analytic procedures. The subjects were 491 children ($\bar{X}$ = 94.6 months, σ = 26.2) who had been administered the SCPMT while they were enrolled in special programs in Indiana, Ohio or Tennessee. The child's performance on each item of each test (i.e., the SCPMT is comprised of the IP, CML, BMC, RLD, SBO/SBC tests; each has 4-12 items) was recorded; the individual item scores and the item total for each test plus age and sex resulted in 44 observations. (This "item-analysis" procedure, although quite possibly not done by the developer of the SCPMT, has been used to analyze other psycho-motor tests.) All observations were intercorrelated and then factor analyzed using SPSS principal components factoring procedures. The correlation coefficients were comparable to those which have been published; the factor analysis resulted in 11 factors for each of the 3 factor solutions used. A lack of overlap of the items of the individual tests suggests, in general, a good job of item selection. However, the BMC was the only test in which all items fell into the same factor; the items of the other tests fell into at least two factors which suggests within-test divergency which would not appear to be desirable. Each of the 5 tests was then individually factor analyzed; the number of observations (i.e., individual items, item total, age & sex) ranged from 9-15. These analyses magnified within-test divergency of items. If the SCPMT is to be continually published, refinement should be considered. It would appear that from a statistical basis, and possibly from a theoretical basis too, select items should be modified and/or deleted in the CML, RLD and SBO/SBC tests.

Wendell Liemohn
1914 Andy Holt Avenue
University of Tennessee
Knoxville, TN 37996-2700

Saturday, April 9
3:30 - 4:30 p.m.

ANTHROPOMETRIC AND FITNESS CHARACTERISTICS THAT DESCRIBED THE 1982 UNITED STATES NATIONAL RUGBY TEAM. Peter J. Maud, S.U.N.Y College at Brockport, Barry Shultz, University of Utah.

The purpose of this study was to document the body composition and fitness characteristics of the United States 1982 National Rugby Team and to note those parameters that differentiate forward and backline players. Twenty-one players comprised the training squad, 20 of whom were available for testing. They were assembled for a ten-day period in June 1982 for the purpose of team training and representative fixtures against the national teams of Canada and England. Body composition data collected included height, weight, percent body fat as determined by the skinfold method (Jackson and Pollock. Brit. J. Nutr. 40:497, 1978) and lean body weight. Anaerobic power was determined from the Lewis equation (Fox and Mathews. Interval Training. W.B. Saunders, 1974) utilizing vertical jump height and body weight, and anaerobic capacity from a 40-second, maximum effort, bicycle ergometer test (Katch et al. Res. Quart. 48:319, 1977). Dominant and non-dominant grip strength were also measured. Subjects were tested for $\dot{V}O_2$ max by standard open circuit spirometry during the last two or three minutes of a continuous, multistage, bicycle ergometer test. HR was recorded electrocardiographically every minute. Test results for the total team (mean ± standard deviation) were: age (yr) 28.1 ± 3.1; height (cm) 181.6 ± 8.6; weight (kg) 86.3 ± 11.7; body fat (%) 9.1 ± 2.7; lean body weight (kg) 78.2 ± 9.3; dominant grip strength (kg) 64.2 ± 9.0; non-dominant grip strength (kg) 60.3 ± 9.5; vertical jump height (cm) 56.9 ± 7.2; anaerobic power output (kgm/sec) 143.2 ± 24.7; anaerobic capacity (kgm/kg.min) 43.2 ± 3.1; VO_2 max (ml/kg.min) 45.9 ± 5.?; HR max (beats/min) 173 ± 8.7. With regards to body composition, forwards differed significantly ($p<.05$) from backline players in that they were taller (187cm vs. 175cm), heavier (94kg vs. 78kg), had higher body fat percentages (10.5% vs. 7.8%), and had greater lean body weight (84kg vs. 72kg). Only in anaerobic power was there a significant difference in fitness parameters studied where the forwards were able to generate greater power output than backline players (157 kgm/sec vs. 130 kgm/sec).

Peter J. Maud
S.U.N.Y College at Brockport
Brockport, NY 14420

Saturday, April 9
3:30 - 4:30 p.m.

APPLICATION OF GENERALIZABILITY THEORY TO VARIATIONS IN MEASUREMENT OF SKINFOLDS. R.A.Oppliger, J.A. Spray, A.E. Lacey, L.D. Anderson,V.K. Dillon, K.J. Shanahan, Dept. of Physical Education & Dance, University of Iowa.

Skinfold measurements are widely accepted as a method of estimating body composition. However, little research has focused on the reliability of this technique, especially within a multi-faceted generalizability setting. The purpose of this investigation was to examine the sources of variability and the relative magnitude of this variability associated with skinfold measures taken by a single investigator at five sites within a generalizability framework. Specifically, nine college-aged males and nine college-aged females, with mean predicted percent body fat of 16.4% and 20.8%, respectively, were measured five times on both the left and right sides of the body at each of five sites using two methods of locating each site. The sites used were the triceps, suprailiac, abdomen, thigh, and calf. The facets used in the generalizability study at each site were gender, subjects-within-gender, method of location, body side and repetition. Subsequent analysis revealed that at three sites(triceps, thigh, and calf) the greatest percent of variance was accounted for by the gender facet(71%, 66%, and 60% respectively), while at the other two sites, the subjects-within-gender facet accounted for the greatest proportion of the total variance(suprailiac 40% and abdomen 51%). True variance as represented by the gender and subjects-within-gender facets accounted for over 90% of the variance in triceps,91%,thigh,92%, and calf,92%, but less in the suprailiac,46% and abdomen,57%. The body side and repetition facets accounted for nearly zero percent of the total variance across all five sites, while the method of location was significant only at the suprailiac site, 15%of the variance. These findings show that for this investigator at these sites, the skinfold measurement technique is reliable when generalized across this universe. Present research is expanding this model to lean and obese populations of the same age.

Robert A. Oppliger
Dept. of Phys. Educ. & Dance
University of Iowa
Iowa City, IA 52242

Saturday, April 9
3:30 - 4:30 p.m.

THE INFLUENCE OF BODY FAT ON STEADY RATE METABOLISM. Thad R. Crews, Western Kentucky University.

The purpose of this investigation was to examine the effect of relative body fat (% fat) on steady rate oxygen consumption ($\dot{V}O_2$). Studies were 16 male volunteers whose mean age was 32.7 yrs. and whose body weight (BW) was between 75.28 and 79.82 kg. with a mean of 77.6 $\pm$ 1.6 kg. Max. $\dot{V}O_2$, $\dot{V}O_2$ at 70% of maximal heart rate and % body fat were determined for each subject. Standard open-circuit spirometric methods were used to obtain $\dot{V}O_2$ values, and body fat was estimated by immersion densitometry corrected for residual air volume. The respective means were: 53.1 (ml/min·kg BW) for max $\dot{V}O_2$, 31.5 (ml/min·kg BW) for steady rate $\dot{V}O_2$, and 13.7% body fat. The relationship between % body fat and steady rate $\dot{V}O_2$ at 70% of maximal heart rate was $r = -.58$. This relationship was significant at the .01 level. Subjects were ranked with respect to % body fat and divided into high-fat ($\bar{X}$=18.3) and low-fat ($\bar{X}$=9.2) groups. ANOVA revealed that the 2 groups were significantly different at the .01 level. ANCOVA, with max $\dot{V}O_2$ (ml/min·kg FFW) as the covariate, was utilized to examine the difference in the mean steady rate $\dot{V}O_2$ between the 2 groups. The high fat group, with a significantly smaller FFW, had a greater steady rate $\dot{V}O_2$ (ml/min·kg FFW) than the low-fat group. It was concluded that as body fat content increases, the steady rate $\dot{V}O_2$ requirement per unit of FFW also increases.

* This study was funded by a grant from the Faculty Research Co mittee of Western Kentucky University.

Thad R. Crews
Department of Physical Education
Western Kentucky University
Bowling Green, KY 42101

Saturday, April 9
3:30 - 4:30 p.m.

FEASIBILITY OF A RAPID CARDIOVASCULAR RISK ANALYSIS SCREENING PROGRAM. Glen H. Porter, Joseph W. Edgett, Gundersen Clinic, Ltd., La Crosse, Wisconsin.

A cardiovascular risk analysis screening program (CRASP) represents an important first step that provides the knowledge and insight required to develop and implement an optimal cardiovascular health improvement program. To determine the feasibility and effectiveness of a CRASP, 152 males and females working at a local manufacturing firm volunteered to participate in the Gundersen Clinic CRASP. The local firm offered the CRASP to their salaried employees as a fringe health benefit. Each participant received a booklet which included a form which was completed at home. Data provided included age, sex, smoking habits, physical activity habits, assessment of personality type, and family history of heart disease. A team of 3 paramedical personnel went to the firm's 7 plants and completed the screening process which required 15 minutes for each individual. Height and weight were determined. Four skinfold sites were measured and percent body fat was estimated. Sitting blood pressure was determined, and a blood sample was drawn for determination of cholesterol, glucose, and uric acid levels (mg/dl). Participants who were 39 years of age or older also completed a 12-lead ECG. The probability of developing coronary heart disease was estimated by using the American Heart Association's Coronary Risk Handbook. Each person received their own results with a written discussion of follow-up action which seemed appropriate. The firm did not receive individual results, but only a statistical summary of the risk factor profile of their employees. Selected results indicated that 26% of the participants had a cholesterol greater than 250, 9% had a systolic blood pressure greater than 140, 39% were smokers, and 1% had a casual glucose greater than 125. Four of 77 ECGs done (5%) were interpreted as abnormal. One year later, the same group was given a repeat risk factor screen. Results indicated that there were no changes in the overall risk profile of the group. There were a few individual changes. Conclusion: An on-site, rapid CRASP can be organized and successfully accomplished. The participants find the program of interest to them, and this particular company found the screening program a cost-effective fringe benefit to offer to their salaried employees. It was demonstrated by the one-year follow-up testing that only providing results and written information about appropriate action to take to reduce risk factors was not sufficient to elicit change in the overall group. The effect of closer and individualized follow-up needs study.

Glen H. Porter
Gundersen Clinic, Ltd.
1836 South Ave.
LaCrosse, WI 54601

Saturday, April 9
3:30 - 4:30 p.m.

PERCEIVED EXERTION DURING ENDURANCE EXERCISE. James M. Pivarnik, St. Louis University; James E. Wilkerson, Indiana University.

The purpose of this study was to determine the effects of different intensities of endurance exercise on perceived exertion and its relationship with other physiological variables. Six endurance trained(mean VO_2 max=64.1 $ml \cdot kg^{-1} \cdot min^{-1}$) and heat acclimatized male subjects ran on a motorized treadmill at three workloads(WL) approximating 40, 60, and 80 percent of their aerobic capacities. Subjects ran for 60 minutes at the lower two WL and for 30 minutes at the highest WL. Venous blood samples as well as urine collections were taken before and after each exercise session. Oxygen consumption(VO_2), respiratory frequency(fr), heart rate(fc), minute ventilation(VE), rectal temperature(Tr), and skin temperatures(Ts) were measured continuously throughout each experimental session. A 9-point Borg scale was used to rate perceived exertion(RPE) at 10-minute intervals. There was a significant positive correlation($r=.95, p<.001$) between mean RPE and metabolic water production, and a significant negative correlation($r=-.56, p<.02$) between mean RPE and percent change in plasma volume. This relationship existed despite only minor changes in plasma volume at any WL. It was also found that the RPE at any given WL had significantly increased by the end of the exercise session(low WL,$p<.05$;medium WL,$p<.001$;high WL,$p<.001$). The RPE increases were greater and occurred more quickly over time as work intensity increased. Correlations were run between RPE and the other continuously monitered physiological parameters over time at each work intensity. It is likely that as exercise intensity increased, a large decrease in plasma volume was partially prevented by the increased amount of water produced through aerobic metabolic pathways. Although significant relationships were found between RPE and all other measured parameters, the increase in Tr at all exercise levels was shown to be the best overall predictor of change in RPE.

James M. Pivarnik
School of Medicine,Physiology
St. Louis University
St. Louis, MO 63104

Saturday, April 9
3:30 - 4:30 p.m.

SKILL IMAGERY CONTROL: INTERNAL FACTORS. Robert M. Kohl, Daniel L. Roenker, and M. Kevin Turner, Western Kentucky University, Bowling Green, Kentucky.

Three experiments are reported which investigate the relationship between measures of imagery ability and skill performance. In experiment 1, subjects (N=48) imaged a rotor pursuit task (9 trials), rested (9 min), and then actually performed the task (9 trials). Measures of imagery control (Gordon) and vividness (Betts) were obtained for each subject. The Gordon test correlated marginally (r=.38) and the Betts test not at all (r=.17) with actual performance. Neither test reliability predicted the effects of imagery practice on actual performance. In experiment 2 a measure of imagery accuracy was developed. Subjects were given a rotor pursuit demonstration (45 rpm), then asked to image the task and to say the word 'top' each time their image made one revolution. The imaged rate of rotation was determined for each subject and compared to the demonstration speed. Only 6% of the subjects imaged at criterion speed with 82% imaging at slower speeds and 12% at faster speeds. Experiment 2 demonstrates that there are differences among subjects in imagery accuracy. Experiment 3 determined the relationship between imagery accuracy and actual performance. The experimental conditions described above for experiment 1 were used with the exception that during imagery practice trials the subjects said the word 'top' each time their image made one revolution. The number of 'tops' was pooled across the nine imagery trials to obtain a measure of imagery accuracy. These imagery accuracy data were then used as a predictor variable in a simple regression model with actual time on target (pooled over the nine performance trials) as the criterion variable. It was found that accuracy of the image was a reliable predictor of actual performance. Thus, the present research demonstrates a new way to measure imagery accuracy and shows that the accuracy of the image is related to actual performance. The primary advantage of this method is that the similarity between the image and the criterion task can be assessed. This is not possible with general tests of imagery ability (e.g., the Gordon or Betts tests). It also opens the door to modifying images in terms of a given criterion task.

Robert M. Kohl
Dept. of P.E. and Recreation
Western Kentucky University
Bowling Green, KY

Saturday, April 9
3:30 - 4:30 p.m.

EFFECTS OF PREFERRED COLOR AND SELECTED VARIABLES ON CHILDREN'S CATCHING. David E. Belka, Miami University, Oxford, Ohio.

The purpose of the study was to determine the effects of selected factors -- height of interception, distance of catch, weight of ball, and preferred color of ball -- on catching process in children. S's were 27 of the 30 children who had participated in the previous year's study as six year-olds and 30 new six year-olds. From a distance of 13', each S caught eight slightly-arced balls for each of the preferred and control color balls. A 7"-diameter ball was used for catches at each of the three heights of interception: chest, waist, and knee heights. This size ball was chosen for all factors based on the previous year's finding of no significant differences as a result of using balls with diameters of 5", 7", and 8 1/2". The same procedures were used for the distance/speed factor except that all catches were at chest height for distances of 8', 13' and 18'. For weight of ball, diameter and color were constant while glue was inserted in balls to produce three different weighted balls. S's caught balls at chest height from 13' for all three ball weights. ANOVA results indicated that neither preferred color nor weight of ball significantly affected process scores for catching. As in the previous year, significant differences occurred for (1) height of interception with the order of scores highest for chest height, then waist, then knee height catches and (2) distance of catch with the order highest for 8', then 13', and then 18' catches. Significant cross-sectional and longitudinal increases were observed as age increased. Gender differences were found, expecially for the younger children, in favor of boys. Chi-square results for gender preference of color resulted in no significant differences. Analysis of preferred color indicated that blue was chosen most, followed by yellow, red, green and orange. When color of ball was analyzed regardless of whether it was a preferred or a control color, significant differences were found. Scores for blue balls were superior to all other colors for the height of interception variable and superior to red and yellow balls for the distance variable. No other color differences were found. Results were discussed in relation to the literature and to findings of the previous year study.

David E. Belka
Physical Education
Miami University
Oxford, OH 45056

Saturday, April 9
3:30 - 4:30 p.m.

TOUCHING BEHAVIORS OF HANDICAPPED AND NONHANDICAPPED CHILDREN FROM TWO EDUCATIONAL SETTINGS. Sue Ellen Miller and Joyce King, Ohio University.

A play setting using a climbing apparatus was employed to observe touching behaviors of twelve handicapped and non-handicapped second graders from public schools and a special school for the mentally retarded. The climbing apparatus was designed by the researcher and built by the local vocational school. It consisted of three sets of stairs with two steps, three steps, and four steps. Each set of stairs was connected to a platform in the middle by a horizontal ladder, a balance beam, and a walking board which increased in width from one end to the other. On the fourth side of the platform was a ramp. The climbing apparatus was painted four colors and measured 30 inches at its highest point. Mats were placed under the apparatus for safety. A single-subject design called a multi-element baseline design was used. Touching behaviors were measured during alternating baseline and two intervention strategies. Children were videotaped as they played on the climbing apparatus under the following conditions. Homogeneous free play: Handicapped alone in free play and nonhandicapped alone in free play; Heterogeneous free play: Handicapped and nonhandicapped together in free play; Heterogeneous structured play: Handicapped and nonhandicapped together in structured play using a movement education format. The three conditions were presented in random sequence four times. Three trained observers collected data from the videotapes using interval recording of five seconds observe, five seconds record. Purposeful touching behavior was recorded and classified either social or aggressive. Interobserver and intraobserver reliability checks were conducted once for every condition in each of the four sequences. Interobserver reliability ranged from 77% to 100% a mean of 90.9%. Intraobserver reliability ranged from 77.2% to 100% with a mean of 88.6%. Results showed that both handicapped and nonhandicapped subjects significantly reduced social touching behavior from baseline and heterogeneous free play to heterogeneous structured play. In the heterogeneous free play condition the nonhandicapped significantly reduced their aggressive behavior and the segregated handicapped subjects slightly reduced aggressive behavior. During heterogeneous structured play both groups significantly reduced their aggressive behavior. It has been concluded that heterogeneous structured play reduced both social and aggressive touching behavior for handicapped and nonhandicapped children.

Dr. Sue Ellen Miller
School of HPER, Grover Center
Ohio University
Athens, OH 45701

Saturday, April 9
3:30 - 4:30 p.m.

DIFFERENCES BETWEEN ACTUAL MOTOR ABILITY AND PHYSICAL SELF-CONCEPT (PERCEIVED MOTOR PERFORMANCE/BODY IMAGE) OF FIFTH-GRADE BOYS.

Pamela A. Kirk and Robert B. Boling, Mississippi State University.

The purpose of this investigation was to determine whether there were significant differences between high and low perceived physical self-concept of fifth-grade boys and actual motor performance. Subjects were 120 fifth-grade boys. Self-concept was measured by the Physical Self-Concept Scale (PSCS). Motor proficiency was measured by a four-item advanced agility/coordination test battery: hand-eye coordintion (Basketball Dribble Test), foot-eye/coordination (Soccer Dribble Test), whole body agility/coordination without running (Side-Step Test), whole body agility/coordination with running (Obstacle Test - Scott Motor Ability Test). Subjects compiled four motor performance scores, two interpretable factor scores on the PSCS, and a composite PSCS score. Significant differences on motor performance was determined by univariant and multivariant analyses. The results of this study indicated that there was a difference between the upper and lower third groups on perceived self-concept and actuai motor performance. The upper group (perceived physical self-concept) was indeed high on actual motor performance. The separate motor performance tasks of the Side-Step Test and the Obstacle Test - Scott Motor Ability Test (whole body agility/coordination with and without running) were assessed as the best predictors for actual motor performance. Consequently, fifth-grade boys exhibit a stable self-concept which accurately predicts their actual motor performances.

Pamela A. Kirk
Robert B. Boling
Mississippi State University
Mississippi State, MS 39762

Sunday, April 10
9:45 - 10:00 a.m.

THE EFFECT OF FORMAT CHANGES IN THE PLAY STRUCTURE ON THE PLAY BEHAVIOR OF THREE-, FOUR-, AND FIVE-YEAR OLD CHILDREN.

Lawrence D. Bruya, North Texas State University.

Eighteen three-, twenty-five four-, and fifteen five-year old children were assessed for the amount of time spent on and off of play structures arranged in a contemporary unified or linked structure format (CULSF) or a traditional separated structure format (TSSF). An AB experimental design was used with the TSSF treatment applied first since it was considered the least complex of the two treatments. Four play sessions were used as treatment for each of the formats with four unrecorded play periods provided prior to treatment in an attempt to decrease the novelty of the setting. A total of 120 minutes of play behavior in each treatment was observed in one-half hour sessions. Reliability between observers was established at the .92 level. Using a 15-second time sampling procedure time spent "on" and "off" each structure was determined. Physical contacts between children and between children and adults were recorded as well as motor patterns selected for use by the children. In the TSSF treatment, time spent on the structure increased with age. In the CULSF treatment time spent on the structure increased with age and was greater than that recorded for the TSSF. For the group as a whole across ages (N = 58), peer physical contact occurred 11% of the time for the TSSF treatment and 18% of the time for the CULSF treatment. Physical contact with teachers occurred 2% of the time for TSSF while occurring .9% of the time for CULSF. Motor patterns selected for use by the children were similar for all age groups and for both TSSF and CULSF. The three patterns which occurred most frequently were standing >30%, sitting >22% and holding-on = 22% of the time. These results supported the assumption that a CULSF will affect children's play behavior differently than a TSSF. However, this was not true for the motor patterns selected for use.

Lawrence D. Bruya
North Texas State University
Division of Physical Education
Denton, TX 76203

Sunday, April 10
10:00 - 10:15 a.m.

PRELIMINARY VALIDATION OF A DEVELOPMENTAL SEQUENCE FOR THE STANDING LONG JUMP. John Haubenstricker, Vern Seefeldt and Crystal Branta, Michigan State University.

This investigation determined the validity of a developmental sequence for the standing long jump as proposed by Seefeldt, Reuschlein and Vogel (1972). The jumping performances of 430 preschool children ranging in age from 30 to 65 months and 1986 primary grade children, from 72 to 107 months in age, were assessed and assigned to one of four developmental levels or stages. The children were grouped into age intervals of six months and the percentage of children performing at each stage in the various age groups was determined. The results then were plotted graphically according to the procedure suggested by Roberton, et al (1980) for the pre-longitudinal screening of motor development sequences. The hypothesized order for the four-stage sequence of jumping reported by Seefeldt, et al was confirmed for both boys and girls across the age levels studied. Most children under 42 months of age performed the standing long jump at the first developmental level. Stage 2 jumping behavior was the most prevalent stage between the ages of 48 and 84 months, whereas Stage 3 jumping behavior became clearly dominant at 96 months of age. Only about 10 per cent of the children in the oldest age group (102 to 107 months) exhibited the most mature pattern of jumping (Stage 4). The percentage of children demonstrating Stage 1 and Stage 2 jumping behavior decreased with increasing age, as hypothesized, with the decline in Stage 1 preceding that of Stage 2. There was little difference in the jumping behavior of boys and girls across the age groups. Although the hypothesized sequence was verified with mixed-longitudinal data, there is need for validation of the sequence in a longitudinal study.

John Haubenstricker
Room 38, IM Sports Circle
Michigan State University
East Lansing, MI 48824

Sunday, April 10
10:15 - 10:30 a.m.

THE EFFECTS OF ENVIRONMENTAL AND OPTIC FIELD FLOW CHANGES ON THE ORGANIZATION OF MOVEMENTS BY CHILDREN. Beth E. Barnett, Manhattan College; J. R. Higgins, Teachers College, Columbia University.

The purpose of this study was to investigate the timing of movements by young children relative to events in the environment. Children were instructed to perform a jump over a rolling object; its speed was varied across trials. Cinematographic analysis resulted in the calculation of upper and lower limb angles. Time of movement initiation was derived for both proximal and distal segments of the upper and lower limb. In addition, distance of the rolling object from the subject at the time of segment initiation was calculated. Analysis revealed significant temporal and spatial differences across speeds for the initiation of movement. These results support Bernstein's (1967) position on environmental matching in the organization of movements. Calculation and analysis of the information received from the optic flow field showed no difference across speeds for the value of an optic parameter (tau). This finding, in congruence with Lee's (1981) theory of visual timing strategy, suggests a direct guidance of timing in movement by the visual system.

Beth E. Barnett
Dept. of Physical Education
Manhattan College
Riverdale, NY 10471

Sunday, April 10
10:30 - 10:45 a.m.

THE EFFECT OF STUDENT CHARACTERISTICS ON PROCESS-OUTCOME RELATIONSHIPS IN PHYSICAL EDUCATION.

Stephen Silverman, Louisiana State University.

This study investigated the relationships between student engagement and student achievement in the learning of a psychomotor skill. In addition, the study examined whether the student characteristics of gender, initial skill level, or previous experience with the subject matter mediated the engagement-outcome relationship. Students enrolled in university intermediate swimming classes were pretested, received instruction, and were posttested on the breaststroke. Instruction consisted of four 15-minute classes and was videotaped using two cameras feeding a special effects generator to achieve a split-screen image. Elapsed time was superimposed on the picture. Videotapes were coded for the amount of time students spent in motor engagement, cognitive engagement and the non-engaged categories of management, waiting, and off-task behavior. Data were analyzed by multiple regression to determine if motor engagement, cognitive engagement, or the summed total of motor and cognitive engagement (all engaged time) were significant predictors of posttest scores, over and above the variance accounted for by pretest scores. This procedure, analogous to part correlation, was performed with the student as the unit of analysis for all students grouped together and for trichotomized levels of student previous experience and initial skill level, and for males and females. Pretest accounted for a significant portion of the posttest variance. When all students (N=45) were grouped together, none of the three engagement variables was a significant predictor of residualized achievement. When analyses were performed for the various levels of student characteristics a number of significant relationships, both positive and negative were found. Student engagement rates in physical education were related to residualized achievement score based, in part, on the characteristics of the student. Future time-on-task research should investigate which types of instruction and practice in physical education classes are the most appropriate for which groups of students.

Stephen Silverman
School of Kinesiology
Louisiana State University
Baton Rouge, LA 70803

Sunday, April 10
11:15 - 11:30 a.m.

GENERALIZABILTY OF A MULTI-USE TEACHER TRAINING, CONCEPT REINFORCEMENT, AND EVALUATION DEVICE. Pamela D. Christenson and Gregory M. Christenson.

The purpose for this study was to assess whether resistance to persuasion skills taught in one condition would generalize to another situation. A videotape that had been demonstrated as an effective device in the evaluation, reinforcement, and teacher training of specific resistance to persuasion skills taught sixth graders, enrolled in a smoking and health curriculum, was used to assess those same skills taught in an alcohol program.

The videotape depicted three separate one minute scenarios with teenagers resisting peer pressure to use. A paper and pencil device was used to collect data demonstrating students' ability to recognize specific resistance to persuasion skills.

Forty sixth grade classrooms were randomly assigned to one of two experimental conditions or one control. Experimental teacher groups taught resistance to persuasion skills in either a smoking and health curriculum or in an alcohol curriculum. Control teacher groups received no training in resistance to persuasion skills. One month following implementation of the project, assessment of student ability to discriminate specific resistance to persuasion skills was completed.

Mantel-Haenszel summary chi-square statistics were computed to determine whether students in experimental groups one and two differed significantly from one another and controls in their abilities to identify specific resistance to persuasion skills. Results were interpreted as showing that students trained in the smoking curriculum were significantly better at identifying resistance skills than either experimentals trained using the alcohol curriculum or controls. Experimental subjects trained using the alcohol curriculum were significantly better at identifying resistance skills than controls. These results were interpreted to mean that generalization of specific resistance to persuasion skills was possible, however, as would be expected the ability to identify resistance skills was slightly diminished in the secondary situation.

Pam Christenson, Director
Smoking/Alcohol Risk Reduction
P.O. Box 2500
Salt Lake City, UT 84110-2500

Sunday, April 10
11:30 - 11:45 a.m.

THE EFFECTS OF THREE DIFFERENT ORGANIZING CENTERS ON TEACHER-STUDENT BEHAVIORS. Susan C. Van Dyke, University of Denver.

The purpose of this study was to determine if teacher-student behaviors changed when teaching different organizing centers in physical education, that is, to determine if different content affected the way teachers presented that content, conducted the activities, or interacted with the students. The organizing centers used in this study were three curricular units of instruction that included: Ball Handling, Physical Fitness, and Cooperation. All curricular materials used by each subject included a philosophy, aims, behavioral objectives, and content, with methodology left to teacher discretion. Six teachers were chosen from Denver public schools of Colorado. All teachers were familiarized with the three curricular units of instruction; teachers were observed teaching fourth grade classes on these appropriate objectives, for each of the three units. Fifteen minute episodes of CAFIAS (Cheffers Adaptation of Flanders Interaction Analysis System) coding were randomized during the middle portion of each class observed. A total of nine observations were made on each teacher. A 3 x 6 factorial analysis of variance was performed on each of the 18 dependent CAFIAS variables to test the null hypothesis for significant unit and teacher differences. Results indicated: (1) The teacher contribution verbal and student contribution verbal variables resulted in the rejection of the null hypothesis of no difference in teacher-student verbal behaviors between units of instruction. A post hoc multiple comparison test identified the physical fitness unit as being significantly different from ball handling and cooperation in that there was a greater percentage of teacher verbal behaviors and a smaller percentage of student verbal behaviors. (2) The teacher effect aspect of the analysis isolated seven CAFIAS variables as being statistically significant. Results support the assumption that given the same content teacher differences commonly occur. In conclusion it can be said, that organizing centers can influence responding teacher-student behaviors in some ways, particularly in verbal interactions.

Susan C. Van Dyke
Sport Science & Physical Ed. Dept.
University of Denver
Denver, CO 80208

Sunday, April 10
11:45 - 12:00 p.m.

DETERMINING TEACHING ROLE COMPETENCE AND INCOMPETENCE THROUGH THE STUDENT-TEACHING EXPERIENCE. Paul G. Schempp, Kent State University.

The purpose of this study was to determine how student-teachers determine teaching role competence and incompetence through the student-teaching experience. Data were collected from student-teachers (N=20) using the critical incident technique. The technique required the subjects to report specific incidents which led them to believe they were: a) making no progress in becoming a better teacher (incompetence) and b) becoming a better teacher (competence). A total of 301 incidents were reported. Data were analyzed using a critical incident technique. In accordance with this procedure, four data classification systems were established: Incident Descriptors; Incident Involvement; Incident Domain; and Incident Involvement x Domain. Within each classification system, appropriate categories were derived to allow further analyses and interpretation. The classifications and subsequent categories were applied to the 301 critical incidents reported by the student-teachers. Data competence was most often reported using descriptors of teacher-approved activity, teacher-planned lessons, teacher's feelings, students' work and teacher telling students. Role competence primarily involved incidents with the entire class and dealt with either the social or emotional student domain. Based on analysis, it was concluded student-teachers believed themselves competent when they told students to work on teacher-planned activities and the entire class responded with social and emotional behavior the teacher felt appropriate. Role incompetence was most often described in terms of teacher's feelings, student work, class time, teacher's effort and students' listening. Dominant incompetence incidents involved the entire class and centered around the social behavior of the students. Based on data analysis, it was concluded student-teachers believed themselves incompetent when their teaching efforts resulted in the entire class not listening, not working and wasting class time. It was further noted, a student-teacher's role competence and incompetence appeared to have little to do with teaching cognitive or motor skills.

Paul G. Schempp
261C Memorial Annex
Kent State University
Kent, OH 44242

Sunday, April 10
12:00 - 12:15 p.m.

SPORT ROLE SOCIALIZATION AND ATTITUDES TOWARD PHYSICAL ACTIVITY OF WHEELCHAIR ATHLETES. James Santomier, New York University; Michael J. Kennedy, University of Oregon; Patricia I. Hogan, New York University.

The purpose of this study was to examine sport role socialization and attitudes toward physical activity of elite wheelchair athletes. The subjects were sixty-seven males and seventeen females competing in the 1979 Northwest Regional Wheelchair Qualifying Meet. Each subject completed a personal data questionnaire, a Sport Role Socialization Inventory, and the Kenyou Attitude Toward Physical Activity Scale. Data were grouped into four categories: (1) subjects disabled prior to their seventeenth birth dates; (2) subjects disabled after their seventeenth birth dates; (3) subjects medically classified by the National Wheelchair Athletic Association as I, II, and III, and (4) subjects classified as IV, V, VI. Results of a three-way analysis of variance indicated that: (1) there was no significant difference in sport role socialization by the family, the school, the peer group, and the community between subjects disabled before their seventeenth birth dates and subjects disabled after their seventeenth birth dates; (2) there was no significant difference in sport role socialization between subjects classified I, II, and III and subjects classified IV, V, and VI; (3) there was no significant difference in attitudes toward physical activity between subjects classified I, II, and III and subjects classified IV, V, and VI; and (4) there was a significant difference ($F=5.12$, $p < .05$) in attitudes toward physical activity between subjects disabled prior to their seventeenth birth dates and subjects disabled after their seventeenth birth dates. It was concluded that: (1) the age at onset of disabilities and the severity of the disabilities were not significant factors affecting sport role socialization; and (2) the age at onset of disabilities and the severity of disabilities were significant factors affecting the attitudes toward physical activity of wheelchair athletes. Subjects disabled early in the life cycle were significantly less positive toward physical activity than subjects who acquired disabilities later in the life cycle.

James Santomier
Prog. in Physical Educ. and Sport
New York University
New York, NY 10003

Sunday, April 10
11:00 - 11:15 a.m.

LEISURE EDUCATION AND SOCIAL SKILLS LEARNING FOR CHILDREN WITH LEARNING DISABILITIES. Stuart J. Schleien, Ph.D., University of Minnesota - Minneapolis.

The purpose of this study was to develop a behavioral training program of cooperative leisure skill activities and determine its effects on the nature of play in children with learning disabilities. A modified levels of play scale and a partial-interval behavior observation time sampling technique was used to determine the amounts of inappropriate, isolate, parallel, and cooperative play exhibited by the subjects throughout the study. Within a multiple baseline time series design across classrooms, results indicated a significant increase in the percentage of time subjects played cooperatively and significant decrease in subjects' inappropriate behaviors as compared to baseline rates. It was concluded that a school-based leisure education instructional program of cooperative leisure skill activities and special education classroom techniques could be instrumental in enhancing learning disabled childrens' social skills and reducing inappropriate, stereotypic behaviors that could interfere with the acquisition of other skills.

Stuart J. Schleien, Ph.D.
Div. of Rec., Parks & Leisure Studies
University of Minnesota
Minneapolis, MN 55455

Sunday, April 10
11:15 - 11:30 a.m.

THE EFFECTS OF A HOME-BASED, PARENT INTERVENTION MOTOR DEVELOPMENT PROGRAM ON DEVELOPMENTALLY DELAYED CHILDREN.

Michael J. Paciorek, Eastern Michigan University.

This study focused on developmentally delayed children who participated in a home-based, parent intervention motor development program. The major question considered was the following: Is there any difference in gross and fine motor mean scores obtained on the Peabody Developmental Motor Scales (field-test edition), received by (a) those children who participated in the program and (b) those children who did not participate in such a program? Twenty children, ages 4.6 to 6.6 years and classified in a school setting as being developmentally delayed were the target population for this study. Subjects were randomly assigned from this group to an experimental group ($\underline{N}$ = 10) and comparison group ($\underline{N}$ = 10). Subjects were pretested on the Peabody Scales to determine gross and fine motor developmental ages. The 8-week program was administered by the subjects' parents and was based on a series of developmental activities accompanying the Peabody Scales, designed to teach each skill included in the scales. The program was monitored and adjusted weekly by visits to the home by the researcher. Analysis of posttest data revealed gross motor scores of the experimental group improved significantly over gross motor scores of the comparison group, while fine motor scores of both groups improved significantly.

Dr. Michael J. Paciorek
HPER&D, Eastern Michigan University
Ypsilanti, MI 48197

Sunday, April 10
11:30 - 11:45 a.m.

A PROPOSED PHSYCIAL EDUCATION CURRICULUM PARADIGM. Barbara Ann Boyce and L. Janet Wells. Florida State University.

The purpose of this study was to prepare, validate and revise a proposed curriculum paradigm in physical education built upon theoretical as well as practical considerations. This model was a modified cybernetic paradigm and consisted of the following major components: the input factors included learner, practical considerations and education; the process components encompassed the purposes of physical education; the output factor was the curriculum; and the evaluation consisted of a closed loop for feedback. This curriculum paradigm and accompanying material was developed from an extensive review of literature and as a result of two preliminary pilot studies. The data population was randomly drawn from AAPHERD's Curriculum Academy, who served to validate and revise this model. Two hundred eighteen persons examined the model and completed the questionnaire. The questionnaire responses were tabulated on a 44% return rate (n = 218) and met the 90% Confidence Level. Three data sources were utilized: 5-point Likert scale questions, open-ended questions and omission errors. Descriptive data which consisted of mean, standard deviation, percent, and percent mean were analyzed to discover areas for possible model revision. The scores of the Likert scale questions yielded a grand mean of 2.03 which indicated a strong overall approval for the proposed curriculum model. There were 521 open-ended responses and 21 omission errors comments recorded. A cross matching ploy, which utilized three data sources, resulted in 21 revisions to the paradigm. The data supported the conclusion that the proposed curriculum model could provide a theoretical and practical basis for making curriculum decisions.

Barbara Ann Boyce
Department of MSPE
Florida State University
Tallahassee, FL

Sunday, April 10
11:45 - 12:00 p.m.

QT INTERVAL CHANGES IN MAN DURING EXERCISE FOLLOWING CARBOHYDRATE DEPLETION/LOADING AND VITAMIN B-6 SUPPLEMENTATION.

F. Goulard, J.E. Leklem, D.E. Campbell, Human Performance Lab, Oregon State University, Corvallis, OR 97331.

Four young trained men were studied during 50 min of continuous bicycle ergometer exercise of 30 min at 60% max HR, 15 min at 80% max HR, and 5 min at 90% HR to determine the effects of carbohydrate (CHO) depletion/loading regimens and vitamin B-6 supplementation on the QT interval. The criterion measure was the D value which represented the difference, in seconds, between a QT corrected value during an exercise intensity and that which existed at rest. D values were smaller (0.009±0.021 vs. 0.027±0.013; $p<.01$) at all three work intensities following an 11% CHO depletion diet as compared to the responses following the 40% CHO normal diet. Following ingestion of a 71% CHO loading diet, D values were smaller (0.014±0.024; $p<.02$) at the 90% max HR intensity as compared to the 40% CHO normal diet. Upon supplementation of 8mg of vitamin B-6 to depletion and loading diets, D values were greater (0.025±0.024 vs.0.011±0.025 and 0.053±0.022 vs 0.047±0.020, respectively; $p<.01$) at the 60% max HR intensity as compared to the same diets with normal amounts (2mg) of vitamin B-6. Results illustrate unfavorable influences of CHO depletion diets at 60%, 80%, and 90% max HR intensities and CHO loading diets at the 90% max HR intensity on the QT interval during endurance exercise. In addition results indicate favorable effects of vitamin B-6 supplementation at 60% max HR on the QT interval during such exercise.

Supported by the Oregon Agricultural Experiment Station.

Donald E. Campbell
Department of Physical Education
Oregon State University
Corvallis, OR 97331

Sunday, April 10
1:15 - 1:30 p.m.

A SUBMAXIMAL STEP TEST UTILIZING A VARIABLE HEIGHT BENCH.

Beth S. Rosenberg, Rachel A. Yeater, Mary Kay White.
West Virginia University.

This study was designed to construct a submaximal step test, utilizing a variable height step bench, to evaluate cardiorespiratory endurance in females. The variable height bench was employed to accommodate individual differences in leg length which previously has been shown to influence step test scores. Two separate tests (the W.V.U.I for sedentary women and W.V.U.II for active women), each consisting of a maximum of 16 one minute innings, were constructed to accommodate females of varying activity levels. Reliability coefficients were high for both tests ($r = .946$, $p < .01$ and $r = .947$, $p < .01$, respectively). Validity was established by having 60 females, age 18-35 yrs., perform a symptom limited Balke treadmill test. On a separate day, 17 subjects performed the W.V.U.I step test, while 43 performed the W.V.U.II test. Validity coefficients of .487 ($p < .10$) and .410 ($p < .05$) were reported for the W.V.U.I and II tests, respectively. When correlated with the Balke treadmill test to a heart rate of 180, the coefficients increased to .672 ($p < .01$) and .539 ($p < .01$) for the W.V.U.I and II tests, respectively. Although such correlations compare favorably with those obtained on many other submaximal tests, they remain low. There is evidence that the accommodating bench height utilized in this study may have discriminated against the taller subjects, with their decreased natural frequency. The insight gained from this study will be of vital importance in providing guidelines and directions for future research endeavors.

Beth S. Rosenberg, M.S.
260 Canfield St. #1
Star City, WV 26505

Sunday, April 10
1:30 - 1:45 p.m.

COMPARISON OF CRANKING vs PULLING ARM ERGOMETRY FOR ELICITATION OF $\dot{V}O_2$max IN FEMALE NORDIC SKIERS. Susan Klappa, Robert Serfass, D. Roy Wolfe, University of Minnesota.

Eighteen female nordic skiers ($\bar{x}$ age = 23.4 $\pm$ 4.5 yrs, $\bar{x}$ height = 167.3 $\pm$ 5.8 cm, $\bar{x}$ weight = 58.6 $\pm$ 5.4 kg) were divided into high (n=7), moderate (n=6), and low (n=5) performance groups based on a combination of their best 5 and 10 km race times. Each subject was familiarized with continuous, incremental cranking and pulling protocols on a modified Monarch Rehab Trainer for the purpose of eliciting arm $\dot{V}O_2$max. The Monarch Trainer was modified using a system of pulleys to more closely simulate arm pulling during nordic skiing. Subjects were randomly assigned two cranking and two pulling tests and mean values were used for statistical analysis. A 2x3 (tests x groups) ANOVA with repeated measures across tests produced a significant main effect among groups for $\dot{V}O_2$max and $\dot{V}_E$, while between test differences were found for $\dot{V}_E$ and R. A Tukey's w-procedure revealed that the high performance group had significantly higher arm $\dot{V}O_2$max values ($\bar{x}$ = 33.38 ml·kg^{-1}·min^{-1}) than the low performance group ($\bar{x}$ = 24.69 ml·kg^{-1}·min^{-1}). The moderate performance group $\dot{V}O_2$max value of 27.29 ml·kg^{-1}·min^{-1} was not significantly different from the values of the other two groups. The reliability coefficients for arm $\dot{V}O_2$max protocols for the total group (N=18) were 0.88 for cranking and 0.83 for pulling. Linear regression analysis used to predict arm pulling $\dot{V}O_2$max in l·min^{-1} or ml·kg^{-1}·min^{-1} from arm cranking $\dot{V}O_2$max revealed correlation coefficients of 0.84 and 0.86 with standard errors of estimate of 0.157 l and 2.81 ml respectively. These data indicate that arm cranking protocols may be used to provide reasonable predictions of the more specific arm pulling $\dot{V}O_2$max in skiers.

Susan Klappa
Division of Physical Education
University of Minnesota
Minneapolis, MN 55455

Sunday, April 10
1:45 - 2:00 p.m.

EFFECTS OF LSD MARATHON TRAINING ON UNTRAINED FEMALES. Forrest A. Dolgener, University of Northern Iowa.

The purpose of this study was to determine the effects of 16 weeks of long slow distance (LSD) training to run a marathon in 11 untrained females (M=23 years). None of the subjects had been a regular runner prior to the study. Prior to the training program, all subjects performed a submaximal and a maximal oxygen consumption test on a treadmill. The following variables were measured at the steady-state submaximal speeds of 3 and 6 mph and at max: $\dot{V}O_2$, HR, $\dot{V}_E$, and R. In addition, vital capacity, 1-sec. forced expiratory volume and the sum of 6 skinfolds were determined pre and post training. Subjects trained using a progressively increasing mileage program with the mileage reaching 45-70 miles a week during the last two weeks of the training. All training was performed at 70% of the heart rate reserve. All subjects completed the training and completed a marathon at the end of week 16. Subjects were post tested during week 15 and 16. $\dot{V}O_2$max significantly increased from 40.1 to 46.6 ml/kg·min^{-1}. Both HR and R at 3 and 6 mph significantly decreased. All other variables were unchanged. The results indicate that LSD training enhances some of those variables that are manifested in an improved efficiency of the cardiovascular system. Although no improvement in the efficiency of O_2 utilization occurred, other variables which could enhance performance did improve. The decrease in R at both submaximal speeds might have been due to a greater fat utilization which would probably be beneficial at a marathon distance.

Forrest A. Dolgener
School of HPER
University of Northern Iowa
Cedar Falls, IA 50614

Sunday, April 10
2:00 - 2:15 p.m.

THE FUNCTION OF AGE, GENDER, AND BODY MASS ON CARDIORESPIRATORY ENDURANCE. Dr. Jan Nelson, San Diego State University.

The purposes of this study were to determine if cardiorespiratory endurance was a function of gender, and if so, could the gender differences be explained by age and body mass? With the growing emphasis on women in physical activities and health-related fitness, studies such as this will impact norming procedures and physical education curricula. Data were 4,897 boys and girls in the normative sample for the 1980 AAHPERD health-related physical fitness test. Subjects ranged in age from 6 to 17, represented all areas of the U.S., and were 46.7% female and 53.5% male. The dependent variable was cardiorespiratory endurance as measured by the mile run. Independent variables were age (linear and non-linear), gender, and body mass index (WT/HT^2). Multiple regression analysis was used to evaluate the effects of these variables on the mile run, and to develop age-performance curves for boys and girls. It was hypothesized that body mass index would explain significant gender variation in the mile run. Boys were found to perform superior to girls. When controlling for age in combination with body mass index, gender explained the same amount of variation as before. This showed that body mass index did not explain the gender differences, refuting previous studies. An age by gender interaction existed, which demonstrated that cross-sectional performance curves for boys and girls were not parallel over the ages studied. Boys outperformed girls at all ages. Up till age 11, both boys and girls improved their run times. After age 11 boys continued to improve. Girls leveled off at about age 12, and after 14 their performance decreased substantially through age 17. Literature does not offer an explanation for this reversal. Perhaps purer measures of body composition and body structure measures would explain gender variation. Cultural influences may also explain significant gender differences in cardiorespiratory endurance. Training is related to endurance. Traditional boys' activities (organized and unorganized) result in training to a much greater extent than do girls' activities. Psychologists tell us that peer pressures to conform are greatest at puberty. This may help to explain the decrease in girls' performance. Cultural values are changing, however, and among the changes is an increasing acceptance of male and female participation in all physical activities. In future studies of this genre, one would expect to find gender differences in cardiorespiratory endurance decrease. All that can be concluded from this study, however, is that age and body mass do not explain the gender differences that exist in cardiorespiratory endurance.

Dr. Jan Nelson
Women's Gym 402
San Diego State University
San Diego, CA 92182-0171

Sunday, April 10
2:15 - 2:30 p.m.

GENERALIZED MODEL OF COMPETITIVE RUNNING PERFORMANCE.

Carl Foster, University of Wisconsin Medical School - Mount Sinai Medical Center, Milwaukee, WI.

Maximal oxygen uptake (VO_2 max) is accepted as an important determinant of competitive running performance. Regression equations describing the relationship of VO_2 max to performance at specific distances have been published from several laboratories. However, VO_2 max is a general measure of endurance and probably relates more to the general level of performance by an athlete than to performance in a specific event. The purpose of the present investigation was to determine the relationship between VO_2 max and a general measure of running performance. Experienced runners (N=123) were studied during uphill treadmill running to determine VO_2 max. Competitive performances during 3 months before or after study were equated as performance quality points on the basis of scoring tables published by Gardner-Purdy (GP) or Daniels-Gilbert (DG). The highest number of points for each athlete, regardless of the distance at which it was produced, was accepted as the score for that athlete. The relationship between VO_2 max and performance quality was determined using multiple regression. The subjects were highly variable with respect to the following variables: age ($\bar{x}$ = 26.9 ± 9.7 year [range 18-71]), VO_2 max ($\bar{x}$ = 62.9 ± 6.7 $ml \cdot min^{-1} \cdot kg^{-1}$ [range 47.2-81.0]), GP points ($\bar{x}$ = 572 ± 190 [range 190-1010]), and DG points ($\bar{x}$ = 56.7 ± 9.2 [range 38.6-78.9]). The relationship between VO_2 max and performance quality was best described by linear regression: GP points = 23.56·(VO_2 max)-909, r = 0.84. SEE = 101.4; DG points = 1.128·(VO_2 max)-14.2, r = 0.82, SEE = 5.3. These two generalized models were cross-validated by comparing the predicted versus actual VO_2 max-performance quality for individual athletes reported in 11 published studies from other laboratories (N=141). For the GP model 63% of cross-validation sample fell within ± 1 SEE and 93% within ± 2 SEE. The 7% outside ± 2 SEE all produced better performances than predicted. For the DG model 72% fell within ± 1 SEE and 91% within ± 2 SEE of the predicted value. The 9% of subjects outside the ± 2 SEE all performed better than predicted. The results suggest that the general level of running performance attainable by an athlete may be accurately predicted by a linear regression model. Cross validation studies suggest that these generalized models are valid and applicable to a broad range of athletes. The generalized models may thus provide a useful mechanism for the practical application of physiological laboratory data.

Carl Foster, Ph.D.
Cardiac Rehabilitation Program
Mount Sinai Medical Center
Milwaukee, WI 53233

Sunday, April 10
2:30 - 2:45 p.m.

THE EFFECTS OF CHRONIC ARM WORK ON BLOOD LIPIDS AND SELECTED PHYSIOLOGICAL PARAMETERS, Joseph E. Donnelly, Human Performance Laboratory, Kearney State College.

Fourteen volunteer subjects ages 21-52 were randomly divided into experimental (♂ 5, ♀ 2) and control (♂ 3, ♀ 4) groups to assess the effects of 12 weeks of progressive arm ergometry on blood lipids, heart rate, blood pressure, and body composition. The control group received pre and post tests of arm ergometry (GXT), hydrostatic weighing, and fasting blood lipids, however they were otherwise sedentary. The experimental group received identical pre and post tests and were subjected to 3 sessions of arm work per week for 12 weeks. The work was adjusted from 70% to 85% of the predicted maximum heart rate calculated from a modified Karvonen formula. The duration of each work bout increased from 20 to 30 minutes as the subjects became more fit. There were no significant differences found in any measure in the control group. For the experimentals, heart rate showed significant decreases ($p < .05$) between pre and post GXT in both exercise and recovery. Systolic and diastolic blood pressures showed no changes. Percentages of body fat demonstrated a 3.44% decrease ($p < .05$) between pre and post tests. Cholesterol showed a decrease of 8%, triglycerides decreased 38% and HDL cholesterol increased 8%. However the changes were statistically non-significant ($p < .05$).

Joseph E. Donnelly
Kearney State College
Kearney, NE 68849-0506

Sunday, April 10
2:45 - 3:00 p.m.

SERUM CREATINE KINASE ACTIVITY FOLLOWING THREE ISOMETRIC EXERCISE CONDITIONS. Sandra J. Mayer, Priscilla M. Clarkson, University of Massachusetts.

To determine factors involved in exercise induced increases in serum creatine kinase (CK) activity, enzyme levels were assessed following three knee extension isometric exercise regimens in nine college-age subjects. The first exercise consisted of a series of 60-second contractions of 40% MVC intensity with 60-second inter-trial rests (60:60) until exhaustion. The number of contractions a subject could complete was determined and used to set the other two exercise conditions that were presented in balanced order. The remaining conditions consisted of either twice the determined number of 60-second contractions but each contraction lasting only 30 seconds (30:30), or four times the determined number of 60-second contractions but each contraction lasting only 15 seconds with 15-second inter-trial rests (15:15). Thus the total amount of accumulated contraction time was equated. Serum CK activity was assessed prior to and 6, 18 and 42 hours following the exercises. The test sessions were spaced at least 4 days apart and subjects were instructed to refrain from exercise 2 days prior to and 2 days following each session. Based upon previous studies, it was hypothesized that the 15:15 condition would elicit the greatest increase in serum CK levels due to more mechanical disturbance of the muscle. However, the 60:60 condition resulted in the greatest CK peak increase (130.1%) followed by the 30:30 condition (73.9%), and the 15:15 condition (29.5%) ($F_{2,16} = 4.76$, $p < .05$). Using a repeated measures ANOVA it was determined that the pattern of CK increase over time differed among the three exercise conditions with the 60:60 having the highest CK activity at 6 and 18 hours and the 15:15 condition having the lowest CK activity at 6 and 18 hours ($F_{6,48} = 5.98$, $p < .01$). It was suggested that a greater pressor response associated with the longer duration isometric contractions may influence CK efflux from muscle tissue.

Sandra J. Mayer
Department of Exercise Science
University of Massachusetts
Amherst, MA 01003

Sunday, April 10
3:00 - 3:15 p.m.

SPORT AND THE CHARTER OF AMERICAN HIGHER EDUCATION: A CASE STUDY. Donald Chu, Skidmore College, Saratoga Springs, New York.

The purpose of this study was to determine why it is that the American college/university is typified by an athletic program whose popular appeal and visibility rivals or even surpasses the academic programs of that institution. Why is it that the American school, unlike its counterparts in other parts of the world, is expected to offer as an official component of its structure activities which focus on physical development as opposed to the concentration on mental faculties found in the European colleges and universities? While economic arguments provide some understanding of the reasons for sports existence in our colleges and universities such explanations are insufficient when viewed with the fact that the overwhelming proportion of sport and recreation programs are deficit producing. In the view of this study reason for the existence of athletics on campus lies in the "charter" or unconscious assumptions of the public, that is their understanding of what the American school should do and what it should offer in its programs. The purpose of this study was to survey the general understandings of one private college. What are the assumptions of the faculty, administration and students concerning sport and recreation? Do program expectation and educational rationale vary with discipline, sex? Methodology Questionnaires were distributed to a random sample of 546 students (or 25% of student population of 2186) and to 61 faculty, administration and staff (or 25% of population of 244). Anonymous responses were received for approximately 67% of subjects. Results Initial analysis suggests the strength of student assumptions concerning the legitimate place of intercollegiate sport. Such program expectations are at variance, however, with the expectations of faculty, staff and administration. Variance also exists between faculty of different disciplines. There seems to be little correlation between student major and the rationale for education supported and as expected student as opposed to faculty supported educational rationales embrace athletic program within their philosophy. Conclusions Regardless of the mental focus of its European roots, the student perceived charter of the American college may very well include sport within its program expectations. These are expectations which are at variance with the assumptions of faculty, administration and staff.

Donald Chu
Skidmore College
Saratoga Springs, NY 12866

Sunday, April 10
3:30 - 3:45 p.m.

Sport, Southern Planters, and Athletes in the Slavequarter, 1820-1860. David K. Wiggins, Kansas State University.

The purpose of this study was to determine the manner in which Southern plantation owners utilized slaves in their particular sporting activities and what type of status these talented slaves held in the Slavequarter Community. The majority of slaves living on Southern plantations prior to the Civil War were usually required to either labor in the fields or perform chores in the "big house." Oftentimes forced to toil fourteen hours a day for six days a week, their existance could be extremely varying and oppressive. There were a small number of slaves, however, who in addition to or in place of their regular plantation labor, were utilized for various purposes in the sporting life of the planter. There were an undetermined number of slaveholders who employed their laborers as oarsmen in local boat races, profited from their abilities as horse trainers and jockeys, used their services during hunting and fishing excursions, and exploited their skills as dancers, boxers, wrestlers, and runners. These talented slaves did not necessarily enjoy performing these services for the planter because of the rather demeaning nature of some of the tasks. But they normally held a privileged position in the plantation community and were granted certain rights not usually allowed their fellow slaves. Having special physical skills usually guaranteed these slaves a high degree of status in the slavequarter and concurrently earned them a certain amount of respect from the planter. Like many of today's athletes, ability in sport was often the means to a more rewarding and satisfying way of life. Their particular skills allowed them a certain degree of deferential treatment and permitted them to frequently play roles other than a childlike dependent who was constantly driven to his tasks. Most of these slaves were given a measure of independence which permitted them to leave the plantation frequently, were not constantly under the supervision of whites, and in some cases, had opportunities to earn money. Tellingly, these slaves normally possessed the kind of spirit and greater knowledge of the world which could have been a potential threat to the maintenance of the plantation. However, the slaveholders took the chances, granted the privileges, and condoned the apparent independence for their own sporting reputations often depended on it.

David K. Wiggins, Ph.D.
Dept. of H.P.E.R.
Kansas State University
Manhattan, KS 66506

Sunday, April 10
3:45 - 4:00 p.m.

SPECTATOR VIOLENCE IN SPORT: AN EXAMINATION OF NORTH AMERICAN RESEARCH TRENDS. Robert W. Case, Tulane University, New Orleans.

The incidence of spectator violence at sporting events appears to be increasing at an alarming rate in present-day society. Research specifically dealing with crowd violence in sport has also increased concomitantly. The purpose of this study was to analyze and categorize existing North American sport spectator research in an effort to identify past and present research trends. Several computer and index searches were completed in an effort to indentify past and present research trends. Several computer and index searches were completed in an effort to locate all available sport spectator studies completed in North America. A total of fifty-eight studies were identified and categorized with three major research trends emerging. First, sport psychologists have traditionally studied spectator violence by focusing on the aggression levels of individual fans and the various social psychological research perspectives with crowd size, crowd location, and crowd composition receiving considerable research attention. Second, sport sociologists have used collective behavior theories in their efforts to identify possible determinants of crowd violence in sport. Smelser's (1962) "Value-Added Theory of Collective Behavior" has been the collective behavior theory used most often in the sport setting. Third, other sport researchers have attempted to conceptually analyze and theoretically explain sport spectator behavior through the use of various sociological theories including conflict theory, functionalism, and Elias's theory of the civilizing process. The findings of this study clearly show that certain North American sport spectator research trends can be identified. Moreover, the three trends identified in this study appear to be evolving in separate directions and often offer conflicting views regarding the causes of sport spectator violence. As a result, a multi-dimensional model for the study of sport spectator behavior was presented by this author in an effort to consolidate present research trends and expedite the identification of probable causes and possible solutions to the problem of spectator violence in sport.

Robert W. Case
Department of Physical Education
Tulane University, New Orleans, LA

Sunday, April 10
4:00 - 4:15 p.m.

REFORMIST AND FEMINIST VIEWS OF SPORT IN THE EARLY TWENTIETH CENTURY. Susan J. Bandy, Ph.D., San Diego State University.

This paper examines the development of women's sports during the first three decades of the twentieth century and compares it with the development of the women's movement during the same period. In so doing, the paper focuses principally on the views of women and their participation in sport held by two groups of women involved in the women's sports movement, the women physical educators and the female athletes. These views and the relationship of these views are then compared to the views of women and their participation in society held by two groups of women involved in the women's movement, the feminists and the reformers. It is argued that within both movements, the two groups of women held different and diametrically opposed views of women and their participation within each circumstance, sport and society respectively. The women physical educators argued that women were fundamentally different from men in physical, psychological, and moral terms and advocated a philosophy and a sports program that reflected the difference between and inequality of the sexes. Similarly, the feminists argued that women were fundamentally different from men in economic, social, and physical terms and advocated legislation that reflected the difference between and inequality of the sexes. In contrast, female athletes exemplified the view that women were not significantly different in physical, psychological, and moral terms and participated in sports programs that reflected the similarity between and equality of the sexes. Similarly, the reformers argued that women were not significantly different in economic, social, and physical terms and advocated legislation that reflected the similarity between and equality of the sexes. It is concluded that in both movements, a schism developed between the two groups which held diametrically opposed conceptions of women and their rights. As a consequence, the lack of unity within each group is responsible, in large measure, for the approximate forty-year period of acquiescence experienced by both the women's sports movement and the women's movement.

Susan J. Bandy, Ph.D.
Department of Physical Education
San Diego State University
San Diego, CA 92182-0171

Sunday, April 10
4:15 - 4:30 p.m.

RUGBY IS A "MORAL" GAME: BERKELEY'S REACTION TO THE 1905/1906 FOOTBALL "CRISIS." Roberta J. Park, University of California.

Late 19th and early 20th century American debates over the appropriateness of intercollegiate athletics cut far deeper than questions concerning who would control these events or the "amateur/professional" issue. At stake were fundamental questions regarding the psychobiological nature of man and beliefs about what constituted the ideal social order. There was a widespread assumption that the structure of games, as well as the values associated with them, could be powerful tools for socialization and enculturation. Several studies have investigated the growing agitation which led to what has been referred to as "the football crisis of 1905," and the subsequent formation of the N.C.A.A. Sack and Westby compared the boards of trustees and campus leadership of Harvard and Yale, and concluded that two quite different ideologies undergirded the athletic programs at these two prestigious institutions at the turn of the century. Recently, Smith reassessed the football situation in 1905-06 by focusing upon Harvard and Columbia, and suggested that the American form of the game of football was, indeed, in jeopardy. While a considerable amount is known about the ideologies and events associated with the late 19th and early 20th century debates over intercollegiate athletics--especially football--much still remains at the level of conjecture, or, at best, unconfirmed hypotheses, because relatively few intensive investigations have yet been made of individual institutions. The merits of a detailed study of events and ideologies at individual campuses have recently been highlighted by the study of intercollegiate athletics at the University of Chicago by Lawson and Ingham. Using a wide variety of archival (e.g., letters, reports, memoranda, telegrams, etc.) and published materials, the present study investigates events at the University of California, Berkeley, in 1905-06 concerning athletics, and "ideals" regarding athletics. Some considerable attention is also given to the broader context of ideas regarding intercollegiate athletics in America in the early 1900s. The game of rugby was substituted for American football because it was assumed that the structure of rugby, as well as the values associated with the game, taught the "right" kinds of moral values. U.C. President Wheeler pursued an active campaign aimed at encouraging other colleges and universities, as well as the high schools, to convert to the English game. The arguments raised in relation to athletics addressed fundamental questions about the purposes of a university, as well as about human nature itself.

Roberta J. Park
Department of Physical Education
University of California
Berkeley, CA 94720

Sunday, April 10
4:30 - 4:45 p.m.

THE RELATIONSHIP BETWEEN STRUCTURAL VARIABILITY AND END-POINT ERROR MEASUREMENT. C. Richard Beach; Charles H. Shea, Texas A & M University.

Timing studies typically report only error measurements based on movement end-points. Therefore information is limited in that the terminal measurements may not be representative of the actual characteristics of the entire movement. The recent work of Newell and associates (1979, 1980, 1982) points to the need to investigate the relationship between the entire movement structure and errors measured at the end-point. The present study further investigates the relationship of spatial and temporal end-point error and the movement variability based on kinematics in a rapid-timing task using a linear slide. Subjects (N=8) performed 25 trials under each of 8 amplitude-movement time conditions. Movements were monitored utilizing an optic-microprocessor (CELSPOT) system interfaced with a minicomputer. The results demonstrate that end-point measurements are often unsatisfactory in providing explanations of the terminally measured error relationships and that kinematically derived measurements facilitate a more complete understanding of the movement. More specifically, the results of the present study support the finding that the initial portion of the impulse is more variable proportionally than successively larger portions of the impulse (Newell, Carlton, and Carlton, 1982).

C. Richard Beach
Texas A. & M. University
College Station, TX 77840

Monday, April 11
9:00 - 9:15 a.m.

A FACTOR ANALYSIS OF PHYSICAL FITNESS, MOTOR ABILITY, AND FUNDAMENTAL MOVEMENT PATTERN SKILLS IN FIRST GRADE CHILDREN.

Whitfield B. East, University of Northern Iowa.

The purpose of this study was to investigate the relationships among the components of the three theoretical constructs, physical fitness, motor ability and fundamental movement patterns, which delineate the domain of psychomotor performance. Traditionally these components (e.g., cardiorespiratory endurance, speed, striking, etc.) have been analyzed individually or as constructs, generally utilizing a college-age sample. In this study a sample of first grade students was utilized to determine if unique factor structures exist during the development period. Fifteen motor performance items were selected to represent each component of physical fitness, motor ability and fundamental movement patterns. These items were administered to 22 male and 22 female first grade students. The findings revealed significant sex differences for most of the motor performance items. The data were then analyzed by two factor-analytic techniques, alpha factor analysis and canonical factor analysis, for each sex group and for the combined sample. Only vaximax orthogonal rotation was performed. The factor analysis of the 15 motor performance items revealed a similar factor structure for both sex groups. The following four factors were robust across models: (a) agility and strength of the legs and pelvic girdle, (b) body fatness, (c) spatial awareness (egocentric and objective localization), and (d) body control--balance. The combinations of performance items which compose the four factors are of interest for two reasons. First the items did not rotate into the commonly associated factors of physical fitness, motor ability and fundamental movement patterns. Secondly, three of the four items from the fundamental movement pattern construct, throwing, kicking, and striking, loaded to separate factors. The motor performance items which subsequently loaded in these factors would appear to delineate areas which contribute to the development of these patterns of movement.

Whitfield B. East
School of HPER -- West Gym 209B
University of Northern Iowa
Cedar Falls, IA 50614

Monday, April 11
9:15 - 9:30 a.m.

SYSTEMATIC EFFECTS ON SKINFOLD CALIPER WITH INEXPERIENCED PROFESSIONALS FOR TRICEPS AND SUBSCAPULAR SKINFOLDS. T.G. Lohman, University of Illinois, Urbana-Champaign; J.H. Wilmore, University of Arizona; G. Friestad, University of Illinois, Urbana-Champaign; M.H. Slaughter, University of Illinois, Urbana-Champaign.

With the incorporation of skinfold measurements into the new AAHPERD Health Related Physical Fitness Test to assess the degree of fatness in children, many professionals are purchasing skinfold calipers and obtaining training on the measurement of skinfolds. The purpose of this study was to compare the results from three different types of inexpensive skinfold calipers (Adipometer, Fat-O-Meter, and Slim Guide) with a more expensive, commonly used caliper (Lange) when in the hands of nine inexperienced professionals. In addition, the measurements of inexperienced professionals were compared to those of two experienced investigators using the triceps and subscapular skinfold sites. All professionals were trained to use the Lange caliper and one of three inexpensive calipers (three used the Adipometer, three used the Fat-O-Meter, and three used the Slim Guide). The total number of subjects in the study was 86, 41 males and 45 females. The subjects averaged 13.4 years. Each teacher measured between 9 and 21 subjects, after completing one 30-minute training session illustrating location and measurement technique for each site. The results indicated that readings of the Fat-O-Meter in the hands of the inexperienced professionals were significantly higher than their readings with the Lange (mean difference = 1 to 2 mm) and the readings of the Slim Guide and Adipometer were significantly lower (mean difference = 1 mm). Readings from the inexpensive skinfold calipers correlated quite highly with the Lange caliper in the hands of the inexperienced professionals (.94 to .99). The Lange measurements of the inexperienced professionals were higher than the Harpenden measurements of the experienced investigators (mean difference = 1.0 mm). When the readings of the inexperienced professionals using the Lange were compared to the experienced investigators using the Harpenden the correlations were high, ranging from .90 to .99. Similar results were found when the measurements of the inexperienced professional using the less-expensive calipers were compared with those of the experienced investigators. The results support the viewpoint that meaningful data can be collected by inexperienced trained professionals, but that there exists small to moderate systematic differences associated with lower or higher values than the Lange depending on the caliper in use.

Mary H. Slaughter
125 Freer Gymnasium
906 S. Goodwin Ave.
Urbana, IL 61801

Monday, April 11
9:30 - 9:45 a.m.

GENERALIZABILITY OF THE SKINFOLD MEASURES SUGGESTED IN THE AAHPERD HEALTH RELATED PHYSICAL FITNESS TEST. James R. Morrow, Jr., University of Houston; Tricia Fridye and Steven D. Monaghen, AISD, Alief, TX.

The recently developed AAHPERD Health-Related Physical Fitness Test is to be utilized to assess aerobic capacity, body composition, and musculoskeletal function. Field testing procedures consist of distance runs, skinfold thickness, and sit-ups and sit-and-reach respectively for the portions of the test. Skinfold thickness is to be measured at the triceps and subscapular sites and the sum compared to age tabulated percentile norms. While it is suggested that the tester use the Lange (Cambridge Sci. Inst., Cambridge, MD) or the Harpenden (Quinton Inst. Co., Seattle WA) calipers to assess skinfolds, the use of inexpensive calipers is suggested as a possible alternative. Interest has centered on whether thickness results will change depending upon the measurement schedule utilized. The purpose of this investigation was to use generalizability theory to investigate the variation in skinfold assessment associated with the following facets: gender; subjects nested within gender; testers; instruments and; measures. Gender was a fixed facet while all others were random. The mixed model representation resulted in twenty-three sources of variation which could be evaluated. Testers read the test manual, viewed an expert taking the measures and practiced on a limited number of subjects prior to beginning the study. One-hundred-eighty middle school students had three skinfold measures taken at each site by each of three testers with three different calipers (Lange; Lafayette, Lafayette Inst., Lafayette, IN; Slimguide, Creative Health Prod., Plymouth MI). Expected mean squares were determined and variance components derived for each source of variation. The percents of variation associated with selected sources were: gender (8.60%); testers (2.93%); measures (0.01%); instruments (6.99%); subjects (76.01%) and; testers by instruments (0.12%). No interactive source was associated with greater than 3% of the variation. This indicates that skinfold variability is largely a function of the subjects and little of the variation is associated with other aspects of the measurement schedule utilized. The D-study phase of the investigation resulted in high G coefficients (Gs > .96) across various universes. The results indicate that skinfold assessment utilized in the AAHPERD Health Related Physical Fitness Test is quite generalizable.

James R. Morrow, Jr.
Department of HPER
University of Houston
Houston, TX 77004

Monday, April 11
9:45 - 10:00 a.m.

VALIDITY OF "GENERALIZED" EQUATIONS FOR BODY COMPOSITION ANALYSIS IN WOMEN ATHLETES. Wayne E. Sinning and Judy R. Wilson, Applied Physiology Research Laboratory, Kent State University, Kent, OH 44242.

Equations developed by Jackson, Pollock and Ward (Med. Sci. Sports, 12:175, 1980) and by Durnin and Womersly (Brit. J. Nutr. 32:77, 1974) for estimating body density (BD) from skinfolds purportedly overcome the criticism of population specificity by taking into account age and the curvilinearity of the relationship between skinfolds and BD. Selected equations by these investigators were validated on 83 women athletes against body composition measures determined by underwater weighing. Equations by Katch and McArdle (Human Biol, 45:445, 1973), Sloan, Burt and Blyth (J. Appl. Physiol. 17:967, 1962) and Wilmore and Behnke (Am. J. Clin. Nutr. 23:267, 1970) were also evaluated to determine whether the newer equations were more effective than older ones based on a linear model of the skinfold-density relationship. BDs were converted to relative fat (%Fat) and fat (kg) for analysis. All 10 equations overestimated %Fat from 0.5% for Sloan et al. to 4.8% for one of the Durnin-Womersly equations. Only the Sloan et al. estimate was not significantly different (ANOVA, Newman-Keuls) from measured %Fat. Estimates by equations from Jackson et al. (+0.9%) and Katch and McArdle (+1.0%) were significantly different from measured values but not from the Sloan et al. estimates. All other equations overestimated %Fat by 2.0% or more. Product-moment correlations ranged from .774 for the equation by Sloan et al. to .823 for the equation by Wilmore and Behnke. Standard errors of estimate ranged from 3.1% for the Wilmore-Behnke equation to 3.6% for the Katch-McArdle equation. Evaluation of slopes showed the Jackson-Pollock (0.99303) and Katch-McArdle (1.03345) equations tended toward a constant error over the range of values while the one by Sloan et al. (0.49146) underestimated %Fat in leaner athletes but overestimated it in heavier ones. The analysis of fat content (kg) estimates showed the same results. The Jackson-Pollock (age and the sum of the triceps, thigh and supra-iliac skinfolds) and the Katch-McArdle (triceps, subscapular and thigh skinfolds) equations were most effective providing their constant error is taken into account. However, the newer, "generalized" equations showed no overall advantage over older equations demonstrating once again the need to cross-validate an equation before it is applied to a new group. The adequacy of all such equations for analyzing individuals in order to make precise measures of body composition is again questioned.

Wayne E. Sinning
Appl. Physiol. Res. Lab
Kent State University
Kent, OH 44242

Monday, April 11
10:00 - 10:15 a.m.

PERFORMANCE OF FEMALE INTERCOLLEGIATE ATHLETES ON THE AAHPERD HEALTH-RELATED FITNESS TEST. Cheryl J. Cohen, Susan Hanamm, Rosemary Aten and Susan A. Kelly, Western Illinois University.

As part of a larger project, females aged 18-22 years were tested for fitness using the AAHPERD Health-Related Fitness Test. A total of 90 athletes were tested: badminton (n=12), basketball (n=14), cross country (n=9), gymnastics (n=9), swimming (n=19), softball (n=14) and volleyball (n=13). In addition, 85 non-athlete females served as controls. This test battery includes the following items: a mile run, modified sit-ups, sit-and-reach, and the sum of 2 skinfolds. Although skinfolds were measured, Ss were also tested for body composition using hydrostatic weighing; the percent fat data herein reported were derived from this method. Means and standard deviations were calculated for each subject group, for each test item; in addition, means and standard deviations were calculated for each of the 7 intercollegiate teams. A one-way ANOVA was used to determine significant differences for each test item, athletes vs. non-athletes, and among the 7 teams. The mean age of the total sample was 19.5 years. Athletes were taller (66.9" vs. 64.9" - significant at $P < .05$) and heavier (135.9 vs. 132.8 lbs.) than non-athletes. There was a significant difference ($P < .01$) for each of the 4 test items, athletes having a faster mile run (7:30 vs. 9:58), doing more sit-ups (52.1 vs. 36.9), having a greater sit-and-reach (39.6 vs. 35.5 cm), and having a lower percent fat (20.5 vs. 21.9%). Among the 7 teams, there was no significant difference in number of sit-ups. All other measures (including height & weight) were significant ($P < .01$). Height ranged from 63.0" (gymnastics) to 69.2" (basketball); weight from 119.0 lbs. (cross country) to 149.1 (basketball). Mile run times ranged from 5:35 (cross country) to 9:17 (swimming); sit-ups from 46 (badminton) to 56 (softball & volleyball); sit-and-reach from 34.2 cm (basketball) to 46.3 cm (gymnastics); and percent fat from 16.4 (cross country) to 23.3 (softball). According to recently-developed national percentile norms for this age group (R. Pate, unpublished), athletes as a group ranked higher on all 4 test items than non-athletes. Cross country was highest ranked for the mile run & percent fat; gymnastics ranked highest for sit-and-reach; softball & volleyball ranked highest for sit-ups. From the results of this study, it was concluded that female athletes as a group were more "fit" than non-athletes; however, the differences were not as great as had been expected.

Dr. Cheryl J. Cohen, Director
Human Performance Laboratory
Western Illinois University
Macomb, IL 61455

Monday, April 11
10:15 - 10:30 a.m.

The Effect of Weight Reduction on Body Composition and Strength in High School Wrestlers. *William F. Henjna, Rush/Presbyterian St. Luke's Medical Center; Duane Buterusis, Riverside/Brookfield High School, Anita Krieger, Riverside/Brookfield, High School; and, Donald C. Scherrer, Chicago State University.*

The purpose of this investigation is to determine how strength was affected when wrestlers participated in an intensive exercise program that included weight training, while at the same time reducing body weight through caloric restriction. The sample included 28 high school wrestlers. Prior to the training program, several measurements were taken; weight, percent body fat through hydrostatic weighing, and 8 strength measurements, representing the major muscle groups. Each wrestler was reevaluated after 13 weeks which included both the pre-season and the competitive season. During this time,weight was significantly reduced by a mean of 9.4 pounds $\pm$ 3.5. ($P < .05$). However significant changes in body fat or lean body weight did not occur, with the percent body fat actually showing a slight increase from 13.15% to 14.80%. Strength scores revealed a decrease in 7 out of the 8 selected tests and this decrease was significant in 5 of the 8 tests ($P < .05$); shoulder strength, knee extension in each leg, and leg curls in each leg. Further analysis of the data revealed that for those wrestlers losing 4% or more of their body weight, there was a significant decrease in their lean body weight ($P < .05$). It is concluded that when weight is significantly reduced through caloric restriction and intense exercise, lean body weight is lost. Also occuring at the same time is a significant loss of body strength. Therefore any advantage gained by wrestling in a lower classification that would require the loss of several pounds of body weight, may very likely be offset by a subsequent loss of strength.

Donald G. Scherrer, Professor
Chicago State University - HPER&A
95th St. at King Drive
Chicago, IL 60628

Monday, April 11
10:45 - 11:00 a.m.

BODY COMPOSITION OF ACTIVE AND INACTIVE WOMEN 48-68 YEARS OF AGE.

Jenna R. Knight, University of Illinois, Urbana-Champaign; Jim Misner, University of Illinois, Urbana-Champaign; Timothy G. Lohman, University of Illinois, Urbana-Champaign; William F. Riner, University of South Carolina-Lancaster.

The purpose of this study was to describe the body composition of 27 women between 48 and 68 years of age and to determine which measurements distinguish between physically active and inactive women. Body composition was assessed from measures of six circumferences, six skinfolds, underwater weight, and potassium-40 whole-body counting. The subjects were classified as active or inactive according to their responses on a physical activity survey. The reliability of each measure was determined by correlating the test-retest scores for the entire group. An analysis of variance was completed for each measure to detect significant differences ($p < .05$) between the two activity groups. Significant differences were found for two circumferences, three skinfolds, and per cent fat as measured by underwater weighing, potassium-40, and three skinfold prediction equations. All methods showed the active group to be less fat than the inactive group by between 3.01 and 7.39 per cent fat. A stepwise discriminant analysis procedure was performed on selected body composition measures to analyze the effectiveness of each measure in distinguishing active from inactive group membership. The triceps skinfold was most discriminating followed by the supra-iliac skinfold, biceps skinfold, and underwater weight. It was concluded that physical activity appeared to be one factor which contributed to lower weight, smaller circumferences, smaller skinfolds and lower per cent body fat for the active than the inactive group.

Jenna R. Knight
117 Freer Gymnasium
906 S. Goodwin Ave.
Urbana, IL 61801

Monday, April 11
11:00 - 11:15 a.m.

A COMPARISON OF HEATH AND CARTER'S SOMATOTYPING TO BODY COMPOSITION IN 30-40 YEAR OLD CAUCASIAN MALES. Cheryl L. Miller; Barry C. McKeown, South Dakota State University.

The relationship between Heath and Carter's somatotype and body composition was studied on 50 adult, Caucasian males with a mean age of 34.5 ± 3.3 years. Anthropometric measures, including height, weight, skinfolds, girths, and diameters, were taken for somatotyping. Body composition was assessed from hydrostatic weighing. Vital capacity and residual volume were determined before the subject was underwater weighed. Test-retest reliability coefficients for all measures on 50 subjects ranged from .86 to 1.00. Zero-order coefficients revealed a significant relationship (r=.87) between the first component and fat weight. Zero-order correlations between lean body mass and the second component showed a significant but low relationship of .43, while the coefficient between the second component and lean body mass/height was .69. The third component with height and with weight had coefficients of -.65 and .19, respectively. Regression analysis was utilized to further assess the relationship between Heath and Carter's somatotype and body composition. Multiple regression equations to estimate the first component from height, weight and per cent body fat produced a coefficient of determination accounting for 83% of the variance. Lean body mass and height, where used together, accounted for 76% of the variance for the second component. Further investigation revealed that the two girth and diameter measurements plus height accounted for 95% of the variance for the second component and 90% of lean body mass, with a standard error of 2.9 kg. It was demonstrated, however, that though the bone diameters are significant predictors of the second component, they are not valid predictors of lean body mass. A coefficient of determination of 84% was found for the third component where height and weight together were used as predictors. This study on 30-40 year old Caucasian males indicates that the first component is significantly related to measures of body fatness. The second component and lean body mass are also significantly related in this sample. However, since only 17% of the variance in the second component can be attributed to lean body mass and 35% attributed to lean body mass/height seems to be a question on the sites chosen by Heath and Carter. The third component is significantly related to linearity as determined by a combination of height and weight.

Cheryl L. Miller
Department of HPER
South Dakota State University
Brookings, SD 57007

Monday, April 11
11:15 - 11:30 a.m.

THE RELATIVE CONTRIBUTION OF BODY COMPOSITION, ANAEROBIC AND AEROBIC FUNCTION, AND RUNNING MECHANICS TO RUNNING PERFORMANCES AT 800, 1500 and 10,000 METERS. L.J. Brandon, H.P. Schlect and R.A. Boileau, Physical Fitness Research Laboratory, University of Illinois, Urbana-Champaign.

This study was designed to assess the relative importance of body size and composition, anaerobic and aerobic functions and running mechanics on performance runs of 800, 1500 and 10,000 meters. It was hypothesized that the relative contribution of the selected morphological, physiological and running mechanics factors would change as a function of the running performance distance. Twenty-nine male recreational runners ($\bar{X}$ age = 26.7 years) participated in the study. A treadmill test was employed to measure maximal oxygen uptake (max $\dot{V}O_2$) and the anaerobic threshold. Height, weight and hydrostatic weighing for the assessment of percent fat and fat-free weight were the body composition variables measured. A bicycle test was employed for anaerobic power and capacity assessment. Stride length, stride rate and maximal velocity were determined from cinematographical analysis. Multiple regression analysis was employed to determine the relative contribution of the selected parameters in all three performance runs. As the distance increased from 800 to 10,000 meters the association between running performance and metabolic function, as reflected by $\dot{V}O_2$ max, anaerobic threshold and anaerobic capacity increased. The importance of running mechanics decreased as the running performance distance increased while the influence of body composition was relatively consistent across the running distances. The precision with which running performance could be predicted from selected morphological, physiological and running mechanics parameters was (r = .81; SEE = .13 min (5.6%)) for the 800 m run, (R = .83; SEE = .23 min (4.8%)) for the 1500 m run and (R = .85; SEE = 2.4 min (6.2%)) for the 10,000 m run. The results indicated that the relationship between selected variables and performance changes with distance. Body size and running mechanics become less important as the running distance increases while the relative contribution of metabolic function, particularly aerobic power, increases with distance.

Jerry Brandon
125 Freer Gym
906 S. Goodwin Ave.
Urbana, IL 61801

Monday, April 11
11:30 - 11:45 a.m.

MAXIMUM OXYGEN CONSUMPTION AND BODY COMPOSITION OF FEMALE COLLEGE TRACK AND FIELD ATHLETES WITH REFERENCE TO PERFORMANCE.

Sharon Stirdivant, John F. Alexander, Mike Lawless, University of Minnesota.

The purpose of this study was to determine differences in maximal oxygen consumption and body composition of female varsity track and field athletes and to examine possible relationships between these parameters and performance. The varsity members of the 1982 University of Minnesota Women's Track and Field Team participated in the study (N=36, $\bar{x}$ age=20.17 yrs.). The team was assessed for maximal oxygen consumption ($\dot{V}O_2$ max) and body composition during the 1982 outdoor season. Cardiorespiratory measures associated with determining $\dot{V}O_2$ max were assessed by a modified version of the Taylor test, using successive intermittent 3-minute running bouts on a motorized treadmill. Body composition was determined by underwater weighing; residual volume was measured by a nitrogen washout method. The athletes were grouped into eight categories: distance runners (N=5); mid-distance runners (N=5); sprinters (N=6); hurdlers (N=5); high jumpers (N=3); long jumpers (N=4); throwers (N=7); heptathlete (N=1). They were further examined by ranking within events by performance. Mean maximal oxygen consumption in ml/kg/min, was highest to lowest for the following events: distance, mid-distance, hurdles, sprints, high jump, heptathlon, long jump and throws (range 59.76 to 40.86). Mean percent body fat was lowest in mid-distance performers and highest in throwers (range 16.2% to 27.5%). The highest mean $\dot{V}O_2$ max by event was seen in the 10,000 and 5,000 meter runners (61 ml/kg/min). The mean $\dot{V}O_2$ max was observed to decrease as race distance decreased. There tended to be a rank order relationship between performance and $\dot{V}O_2$ max for distance runners (10,000, 5,000, 3,000 and 1,500 meters). The better distance runners also tended to exhibit a lower percentage of body fat (10,000, 5,000 and 3,000 meters). There was no rank order relationship for $\dot{V}O_2$ max or percent body fat and performance within the shorter races or field events.

John F. Alexander
Division of Physical Education
University of Minnesota
Minneapolis, MN 55455

Monday, April 11
11:45 - 12:00 p.m.

WEIGHT TRAINING INDUCED PERFORMANCE AND ANTHROPOMETRIC CHANGES IN COLLEGE AGE MALES AND FEMALES. Gary Hunter, University of Wisconsin, Madison.

This study's objective was two-fold: 1. Determine the relative response to weight training of college age untrained males and females and, 2. Compare four consecutive day training (M-T-W-TR) with three alternate day training (M-W-F). Students in two weight training classes at the University of WI., Madison volunteered as subjects and signed consent forms. Subjects were weighed and maximally tested on the 1 RM bench press (MBP), bench press endurance (BPE), and standing long jump (SLJ), both prior to and after seven weeks training. Circumference measures were taken at the chest (CC), abdomen, hips, and flexed bicep (CFB). Skinfolds were obtained at the tricep, suprailiac, abdomen and anterior thigh (AT). During training each class performed 8-10 repetitions in each set. Nine sets of each exercise were done each week by both groups (the M-T-W-TR group did two sets three times per week and three sets one time per week while the M-W-F group did three sets each training day). The exercises were bench press, squat, power clean, behind the neck press, two hand curl, bent leg sit up, behind the neck pull down and knee curls. A two x two x two factorial design (sex, training frequency, pre-post) was used. The type I error rate was set at .05. MBP, BPE, SLJ, CC, and CFB all increased significantly with training. AT decreased significantly. No absolute differences between sexes were found in response to training, but the females showed more relative improvement in SLJ, MBP, and BPE. The M-T-W-TR group increased their MBP, BPE, and CC more than the M-W-F group. No other differences between groups were found. Thus, it appears that college age untrained females' potential for weight training induced strength, muscular endurance, and power improvements are at least as great as males' and may even be greater than males' when relative improvements are observed. Also, it is proposed that beginning college age weight trainers improve more on MBP and BPE when training four consecutive days per week than when following the more traditional three day per week training program.

Gary Hunter, Ph. D.
University of Wisconsin-Madison
Dept. of Phy. Ed. and Dance
Madison, WI 53706

Monday, April 11
12:00 - 12:15 p.m.

JOB SATISFACTION AMONG PUBLIC SCHOOL PHYSICAL EDUCATORS. F. Wm. Davis, Fairfield Public Schools, Fairfield, Connecticut.

This study examined the relationship between selected variables (leader behavior, organizational climate, professional orientation, and demographic factors) and Overall Job Satisfaction (OJS). Public school physical educators (grades K-12) from Fairfield County, Connecticut participated (N=246, over 70% of the sample). Subjects were randomly selected and assigned to 1 of 3 subsamples. Multimethod survey procedures were employed using mail questionnaires and interviews. Data were collected using these instruments: LBDQ, OCDQ, Bartol Professionalism Scale, Overall Job Satisfaction Measure (Jobsat), and other investigator-developed measures. Pearsonian Correlations and a Multiple Regression Analysis statistically tested 5 null hypotheses. Eleven of 38 variables produced significant correlations with OJS, collectively explaining 72% of its variance. Five variables contributed to the predictive efficiency of OJS (explaining 70% of its variance) in this stepwise order: faculty Esprit (morale), the Professional Commitment of the individual physical educator, Consideration leader behavior of the physical education director/coordinator, Disengagement (noninvolvement) faculty behavior (negatively correlated), and Years Experience in Program Leadership. A regression equation was proposed for predicting OJS. Participants reported being "somewhat satisfied" with their jobs in general, Relations with Co-workers, Comfort, Challenge, and Resource Adequacy; and relatively less satisfied with Financial Rewards and Promotions. No specific job facet rated "very satisfied" or "not at all satisfied." Results of this study suggest the importance of interpersonal relations and human relations-oriented leader behavior to Overall Job Satisfaction. With significant predictors from organizational, individual, and environmental domains, the findings suggest the multidimensional nature of job satisfaction among public school physical educators.

Dr. F. William Davis
Fairfield Public Schools
760 Stillson Road
Fairfield, CT 06430

Monday, April 11
11:15 - 11:30 a.m.

AN ANALYSIS OF SELECTED CHARACTERISTICS, LEISURE ATTITUDES, AND THE RECREATION PARTICIPATION OF WOMEN IN LEISURE SERVICES.

Karla A. Henderson, University of Wisconsin-Madison; M. Deborah Bialeschki, University of Wisconsin-Madison.

Women are becoming more visible in a variety of professions. Although research has been conducted on various dimensions of work, little is known about the changing leisure lives of these women. Moreover, as more women enter the Recreation, Park and Leisure Service field, it is incumbent upon educators to understand the characteristics, attitudes, and personal participation patterns of these professionals. The purpose of this study was to ascertain the characteristics (including selected demographic and personality attributes), leisure attitudes, and the recreation participation patterns of women employed in leisure services. To obtain data, a mailed questionnaire was sent to a random sample of 100 leisure service professionals and forty female undergraduate recreation majors in Wisconsin. The following results are a preview of the kinds of information which were found regarding female professionals in leisure services. The respondents included 70 women professionals who were employed almost equally by government and non-profit agencies. Thirty-five percent were employed in therapeutic recreation with 20% in youth agencies, 15% in community recreation, and 5% and 4% in camping and parks respectively. These women has been in their position an average of 5.7 years and slightly over half were married. The Bem Sex Role Inventory (SRI) was utilized to look at personality characteristics related to androgyny (possessing both masculine and feminine characteristics). These professionals were androgynous but tended to possess more masculine than feminine behavior traits. No difference existed among these women regarding androgyny based on agency affiliations, job title, marital status or age. The Leisure Attitudes Scale scores were quite high for this group. However, analysis of variance resulted in no difference between attitudes and any of the selected demographic characteristics. Few relationships were found between leisure attitudes and the recreation activities in which women participated.

Karla A. Henderson & M.D. Bialeschki
University of Wisconsin-Madison
276 Teacher Education Building
Madison, WI 53706

Monday, April 11
11:30 - 11:45 a.m.

SPORT IN THE STATUS SYSTEM OF FEMALE AND MALE ADOLESCENTS: COLEMAN REVISTED. Mary Jo Kane, University of Illinois.

The purpose of this study was to examine the relationship between status among adolescents and female athletic participation. This study replicated Coleman's (1961) original work on the status system of high school adolescents. Additionally, this study extended Coleman's work by including the role of female athlete as a potential predictor of status. Finally, Metheny's (1967) typology was applied to determine whether sex appropriate/inappropriate sport correlates with female athletic status. The sample consisted of 242 subjects (126 males; 116 females) from a small Midwestern high school. A forced-choice questionnaire was utilized. Results indicated that little had changed since Coleman's initial study. For males, being an athlete was the single most important predictor of status. Male status was, therefore, achievement oriented. In contrast, the role of athlete was the least important predictor of female status while physical attractiveness was the most important variable contributing to status for females. Status for females remained primarily ascriptive. Results also indicated that when female athletes were isolated and examined as a group, female athletes in sex appropriate sports (i.e., tennis) were significantly more likely to have status than were female athletes in sex inappropriate sports (i.e., basketball). Thus, if and when female athletes had any status, it was those females involved in sex appropriate sports who were not challenging traditional notions of what it means to be an athlete and a female. The data strongly challenge popular beliefs that the Women's Movement in general and Title IX in particular, have altered society's traditional definition of female athlete. Female athletes who engage in sex appropriate sports such as tennis and golf have become the "acceptable" female athletes. As a result, the "new" female athlete is simply a new variation on an old and familar theme.

Mary Jo Kane
Leisure Behavior Laboratory
University of Illinois
Champaign, IL 61820
(217) 333-4125

Monday, April 11
11:45 - 12:00 p.m.

RECIPROCITY AND CHILDHOOD SOCIALIZATION INTO SPORT. Cynthia A. Hasbrook, University of Wisconsin-Milwaukee.

This study focused on the role that significant others play in children's socialization into sport and on the theoretical notion of reciprocity (Bandura, 1969). The purpose of this study was to explore the notion that the role significant others (parents) play in socializing their children into sport is reciprocal in nature rather than unidirectional and causal. A stratified, random sample of 340 students (199 females and 141 males) from required physical education classes in a large suburban California high school was selected. A fixed alternative/open-ended questionnaire which consisted of demographic information items; perceptions of self-ability, interest and level of involvement in sport; and perceptions of parental encouragement to particpate in sport was administered in May, 1982. The test-retest reliability was $r=.956$. Pearson correlation coefficients were calculated between level of sport involvement and parental encouragement for four groups: a) female athletes; b) female nonathletes; c) male athletes; d) male nonathletes. Results indicated that there were moderate, significant and positive relationships between the level of sport involvement and parental encouragement for all groups excepting the male athlete group. Further, when perceived ability and interest were controlled for, the second-order partial correlations were significantly smaller than the original zero-order correlations for all groups excepting the male athletes. Parental encouragement appeared to be an important variable associated with the childhood sport involvement of female athletes but not male athletes. In addition, parental encouragement appeared to be reciprocal in nature or elicited in part by the sport interest and ability of female children but did not appear to be reciprocal or elicited by the sport interest and ability of male children. It was suggested that these differences occur because sport involvement for males is expected and consonant with the male sex-role, whereas sport involvement for females is unexpected and inconsonant with the female sex-role.

Cynthia A. Hasbrook
The University of Wisconsin-Mil.
P. O. Box 413
Milwaukee, WI 53201

Monday, April 11
12:00 - 12:15 p.m.

THE EFFECTS OF ADVENTURE ACTIVITIES ON THE SELF CONCEPT OF ELEMENTARY SCHOOL CHILDREN. Ann Geller Danziger, William Paterson College of New Jersey, Wayne, New Jersey.

Adventure education programs have demonstrated relative success in enhancing the self concept of adult and secondary school participants. This investigation examined whether the elementary school child's self concept is enhanced by adventure activities. To answer this question two research designs were combined. The Solomon four-group design was used with the Piers-Harris Children's Self Concept Scale (CSCS) pre- and posttest. The AB design, a single case design, was used with the Observational System for Instructional Analysis-Interactive Behavior (OSIA-IB). Interactive behavior reflects the self concept of the behaver. This observational instrument was designed to describe the interactive behavior of Erikson's life cycle stages. The subjects of the Solomon four-group design, two fourth-grade classes (N=49), were assigned to an experimental or control group (EG or CG). The CG received a spring curriculum of physical education games, relays and lead-up games. The EG received the adventure activities, a series of initiatives or problem-solving tasks which were physically, psychologically and/or socially challenging. Three subjects from each group were selected for observation (N=6). The observers were trained and tested to ascertain meeting the criterion-related reliability standard, 80%, before data collection. Inter-observer reliability scores for the various categories ranged from 59.2 to 99.7%. The CSCS ANOVA revealed no significant treatment effects, testing effects or interactive effects. The CSCS scores for each individual were also analyzed for each pre- and posttest subject. One CG subject scored a significant gain. Due to the controls on this research, this was attributed to some event outside the treatment. Four EG subjects demonstrated significant gains. The results of the OSIA-IB revealed that the EG subjects used a broader range of interactive behaviors. The percentages for category occurrence demonstrated that the favorable categories were more frequently used by these subjects. It was concluded that for some of the subjects the adventure activities were instrumental in enhancing the self concept.

Ann Geller Danziger
Department of Movement Sciences
William Paterson College of N.J.
Wayne, NJ 07470

Monday, April 11
12:15 - 12:30 p.m.

THE IMPACT OF GIRLS' INTERSCHOLASTIC SPORT PARTICIPATION ON ACADEMIC ACHIEVEMENT. Deborah L. Feltz, Michigan State University; and Maureen R. Weiss, University of Oregon.

This study was designed to assess the influence of athletics and other extracurricular activities on the academic achievements of female high school students. Senior girls (N = 934) were categorized into athlete-only, service-only, athlete-service, or neither groups based on listings from their high school yearbooks. Those taking the ACT college entrance exam (N = 487) were compared on total and verbal scores and to national and state averages. Results revealed that athletes-only recorded the lowest average scores but these could not be attributed to the participation category to which they belonged. Instead, socioeconomic level and extent of involvement factors were found to be highly significant in explaining differences in achievement scores, with higher SES levels and higher levels of involvement predictive of higher ACT scores. Moreover, none of the groups' scores were significantly different from national or state averages. These results refute the notion that athletic participation is detrimental to educational attainment and recomdations for longitudinal, multi-measure investigations of educational achievement are made.

Maureen R. Weiss
Department of Physical Education
University of Oregon
Eugene, OR 97403

Monday, April 11
1:15 - 1:30 p.m.

THE IMPACT OF TITLE IX ON GIRLS' SPORTS PROGRAMS. Susan Taylor, Philip Reuschlein and John Haubenstricker, Michigan State University.

The purpose of this study was to determine the status of women coaches and athletic directors in girls' sports programs in Michigan high schools as a result of Title IX. The sample included: 1) athletic directors from 60 public schools chosen at random from each school classification size (A,B,C,&D), 2) athletic directors from all the private high schools, and 3) all female athletic directors listed in the MHSAA Directory. A questionnaire was developed, field tested, revised, and then distributed to the athletic directors of the 403 selected schools (287 public and 116 private). The respondents included 336 male A.D.s and 67 female A.D.s. Seventy-three percent of the questionnaires were returned. Male administrators accounted for 84% of the responses. The median number of varsity sports offered for boys exceeded the number available for girls except in private schools with female A.D.s. In the public schools, the coaching staff for the boys' programs tended to be larger than those of the girls' programs. Coaches of both sexes were employed in the girls' sports programs, however, very few female coaches were reported in the boys' athletic programs. Female administrators showed a greater tendency toward hiring female coaches (a 5 to 2 female/male coaching ratio for the female A.D.s to a 1 to 1 ratio for the male A.D.s). "Being a male" for coaching in the boys' sports programs was rated more important as a coaching qualification than "being a female" was rated for coaching the girls' sports programs. Male A.D.s thought the shortage of female coaches was due to a lack of desire on the part of the female. Female A.D.s believed the main reason for the shortage was the lack of opportunity females had in athletics. The A.D.s reported a greater turnover of coaches in the girls' sports programs than in the boys' sports programs. Male A.D.s released a considerably higher percentage of female than male coaches from the girls' programs. Female A.D.s released about the same percentage of male and female coaches. Over 50% of all the male A.D.s and the female A.D.s in private schools felt that no girls' sports would ever become self-supporting. In most schools, the responsibilities of the A.D. for the boys' programs had been expanded to include the girls' programs as well. The female A.D.s predicted that someday the girls' programs would all have female A.D.s. The males did not concur with this prediction.

Susan Taylor
Dept. HPE, Rm. 38, IM Circle Bldg.
Michigan State University
East Lansing, MI 48824

Monday, April 11
1:30 - 1:45 p.m.

EFFECTS OF COMPETITIVE OUTCOMES AND MARGINS OF VICTORY/DEFEAT ON PRACTICE BEHAVIOR AND PERFORMANCE QUALITY.

J. Robert Grove, David Pargman, and Cindy McCallister, Florida State University, Tallahassee, FL.

An experiment was conducted to examine the influence of successful or unsuccessful competitive outcomes and small or large margins of victory/defeat on two aspects of performance. Pairs of female undergraduates (N = 84) "competed" against each other in a novel, best-four-out-of-seven dart tossing contest that required them to throw with their nonpreferred hand at a target on the floor five feet away. Independent variables were manipulated by providing false feedback about the outcome and margin of victory/defeat on each trial of competition. This feedback led subjects to believe that they were either winning every time or losing every time by a margin that was either consistently small or consistently large. Dependent variables included the number of practice throws made during a five-minute practice period prior to each competitive trial and point totals for a set of 10 performance throws on each trial. Anlayses of covariance were conducted on the data from the postmanipulation trials (trials 2, 3, and 4) using the data from the premanipulation trial (trial 1) as the covariate. These analyses revealed a significant outcome x trials interaction for the practice data ($p < .04$) and a significant outcome x margin x trials interaction for the performance data ($p < .025$). Followup comparisons using Duncan's New Multiple Range Test indicated: (a) the practice behavior of winners remained constant across trials while the practice behavior of losers decreased significantly across trials; (b) when the margin of victory/defeat was small, there was no difference between winners and losers with regard to points scored; when the margin of victory/defeat was large, losers scored more points than winners on trials 2 and 3 but the same number of points on trial 4. The practice effect is interpreted as consistent with learned helplessness phenomena. The effect on performance quality is consistent with studies finding performance-enhancing effects from short-term failure, but it implicates the margin of victory/defeat as a mediating variable in competitive situations.

J. Robert Grove
201 Montgomery Gymnasium
Florida State University
Tallahassee, FL 32306

Monday, April 11
1:45 - 2:00 p.m.

Ruder, M. K., and Gill, D. L. The Effects of Player Status and Performance Outcome on Team Cohesion.

The purpose of the study was to investigate the effects of player status (starters and reserves) and performance outcome (success and failure) on team cohesion. It was hypothesized that splitting teams into starters and reserves would lower team cohesion ratings and that starters would rate the cohesion of the team higher than would reserves. It was also hypothesized that both starters and reserves would rate the starting unit as more cohesive than the team as a unit, and as more cohesive than the reserve unit. In addition, it was hypothesized that successful teams would increase in cohesion ratings and unsuccessful teams would decrease.

Subjects were forty seven male volunteers composing eight intact volleyball teams who had competed together previously. A one day, consolation bracket volleyball tournament was held with all teams participating in both pool play and playoffs. Teams were administered a baseline cohesion questionnaire before the commencement of their first match. Teams were split into starters and reserves prior to their quarterfinal match. The cohesion of the team, of the starting unit, and of the reserve unit, were assessed following the quarterfinal match. The results of the quarterfinal matches were utilized to determine performance success or failure.

A six-item questionnaire similar to the Sports Cohesiveness Questionnaire (Martens & Peterson, 1971) was used to measure cohesion. A factor analysis of the six items revealed a single factor which was used as the dependent variable for subsequent analysis.

The results indicated that there was no decrease in team cohesion ratings following the split into starters and reserves. In addition, team cohesion was not rated differently by the starters or by the reserves. Differences in ratings of the team as a unit, the starting unit, and the reserve unit were not found for either starters or reserves. Successful teams were significantly higher at the postsplit measure than were unsuccessful teams however, the hypothesized interaction was not significant. While successful teams did tend to increase in cohesion for pre- to postsplit, unsuccessful teams remained consistent.

The findings in this study indicate that perceptions of cohesion are related to performance outcome. However, player status does not seem to affect perceptions of team cohesion.

M.K. Ruder
D.L. Gill
University of Northern Iowa
Cedar Falls, IA

Monday, April 11
2:00 - 2:15 p.m.

DEVIANCY CAUSATION AMONG YOUTH SPORT PARTICIPANTS AND NON-PARTICIPANTS. Douglas Hastad, Northern Illinois University; Jeffrey Segrave, Skidmore College; Robert Pangrazi, Arizona State University; Gene Petersen, Mesa Arizona Public Schools.

The purpose of this investigation was to determine the relative contribution of ten socio-psychological factors in the etiology of deviant behavior among boy and girl youth sport participants (YSP) and non-participants (NP). Although findings of previous investigations suggest a negative association between deviant behavior and youth sport participation, these studies neglected to determine causal patterns of deviant behavior among YSP and NP. Data collected in this study comprised responses to anonymous self-report questionnaires administered to a total sample of 361 sixth grade students (185 boys and 195 girls) from six different elementary schools in the same suburban school district. Independent causal factors were selected based on theoretical relevance and consisted of: socioeconomic status, family status, boredom, self-image, concept of physical self, attachment to school, attitude toward physical education, peer status, deviant associates, and personal values. The dependent variable, deviant behavior, was measured from responses to twelve questions on self-report acts of deviancy. Data analysis employed simple bivariate correlational procedures to determine zero-order relationships between independent factors and deviant behavior. Stepwise multiple regression with forward inclusion was used to ascertain the relative contribution and causal ordering of independent factors in deviancy causation among YSP and NP. In each instance, the criterion or alpha level of significance was $p<.05$. Overall, the bivariate associations show greater relevance to deviant behavior among YSP than NP. Regression analysis indicates that the independent variables account for a substantial amount of variance in the self-reported deviant behavior of YSP (47%) and NP (44%). The pattern of causation according to total standardized effects of deviant behavior for both boy YSP and NP remains relatively similar to that evidenced between total participants and non-participants. Deviant behavior of boy YSP and NP does however, appear to be more influenced by peer status. While a similar overall pattern obtains, the magnitude of the coefficients and relative ordering of the causal variables suggests that different influences account for deviant behavior among girl YSP and NP. It appears that deviant behavior of girl YSP is impacted more than NP by personal values and concept of physical self.

Douglas N. Hastad
Department of Physical Education
Northern Illinois University
DeKalb, IL 60115

Monday, April 11
2:15 - 2:30 p.m.

EFFECTS OF INSTRUCTION AND SUPERVISION IN CAFIAS ON THE ALT-PE OF HIGH-BURNOUT TEACHERS. Whitney Vantine, Middleport Central School, N.Y.; Victor H. Mancini, Deborah A. Wuest, and Elizabeth K. Clark, Ithaca College.

The purpose of this study was to determine the effects of instruction and supervision in Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) on the Academic Learning Time-Physical Education (ALT-PE) of high-burnout (HB) secondary physical educators. Six subjects, identified by the Maslach Burnout Inventory (MBI)(Maslach & Jackson, 1981) as possessing a high degree of burnout, were randomly assigned to treatment and control groups ($n_t = n_c = 3$). ALT-PE was used to describe the nature of the class environment and the learner involvement level. A modified case study design was employed. Each teacher was videotaped nine times while teaching an entire physical education class. The study was divided into three phases: Phase I (three classes) for pretest (baseline) data collection, Phase II (three classes) for application of treatment, and Phase III (three classes) for posttest data collection. The teachers were readministered the MBI at the termination of Phase III. During Phase II, while viewing videotapes of their teaching, the control group received conventional supervisory feedback. In contrast, the treatment group, during Phase II, received instruction, supervision, and feedback in CAFIAS while viewing their videotapes. During the initial session of the treatment phase, both groups received feedback regarding their teaching during Phase I. The teachers then received three additional feedback sessions, each following their teaching of a class. Descriptive statistics were utilized to determine whether differences in ALT-PE categories existed between the treatment and control groups. The following findings were supported, each favoring the HB teachers who received instruction and supervision in CAFIAS: 1. They exhibited an increase in ALT-PE from 27% to 46%. Little variation was observed for the control group (21% to 26%). 2. They exhibited a slight increase in the ALT-PE/Engaged ratio which reflects the appropriateness of the instructional arrangement (63% to 70%). The control group showed a decrease in this ratio (54% to 47%). Findings for the ALT-PE data reflected the influence of systematic feedback on the nature of the teaching environment and the involvement of the learner. Pretest to posttest changes in the MBI data revealed that those teachers who had received instruction, supervision, and feedback in CAFIAS reported a greater change toward a lower level of burnout than those teachers who received conventional supervisory feedback.

Dr. Deborah A. Wuest
Ithaca College, School of HPER
Ithaca, NY 14850

Monday, April 11
2:30 - 2:45 p.m.

MANAGEMENT FACTORS OF WOMEN IN LEISURE SERVICES.

Elizabeth T. Stefanics, University of New Mexico.

This study was designed to investigate the past socialization processes that affect career choice and career mobility in the field of leisure services. The purposes of this study were: 1. To ascertain the presence of management related success socialization factors in current female professionals and female students in the field of leisure services within the Twin Cities area; 2. To identify patterns of socialization that affected career choice decisions of those individuals in the field of leisure services; 3. To identify ideals that women share concerning supervision and administration in leisure services. The experimental design for this study was a focused in-depth interview schedule using a simple random sample of 20 female undergraduate students and 20 female professionals in leisure services in the Twin Cities area. The procedures for treating the data utilized the SPSS computer programs of frequencies, cross tabulations, and multiple responses. This study suggested that trends and patterns existed within the defined sample and should be explored with more women in the field of leisure services. The presence of management-related success socialization factors as established in research on women in business and management was not ascertained in the women in this study. Patterns of socialization arose that affected career choice decisions, especially that influence from family and friends. The women in this study furnished definite perceptions about supervisors and administrators in the field of leisure services. Participants in the study were not negative about their own educational experiences but presented many suggestions and ideas that they felt should be pursued in education. Potential application of the results of this study should encourage one to continue to eliminate discrimination against women in management and to offer up-dated educational experiences for new generations of practitioners to ensure equality and respect within the field of leisure services.

Elizabeth T. Stefanics, Ph.D.
112A Johnson Gym - Dept. HPER
Albuquerque, NM 87131

Monday, April 11
2:45 - 3:00 p.m.

A CONCEPTUAL MODEL OF INCENTIVE VALUES FOR EXPLAINING AND PREDICTING PREFERENCE FOR SELECTED PHYSICAL ACTIVITIES.
Linda M. Lander, University of Georgia.

The purpose of the study was to validate a conceptual model of incentive values in physical activity, and predict activity preference on the basis of incentive values. The hypothesized model of incentive values included eight systems which were based on the work of Birch and Veroff (1966), Kenyon (1968), and Alderman and Wood (1976). The eight systems were hypothesized to include eighteen dimensions. The Inventory of Incentive Values, designed to validate the hypothesized model, was administered to 700 university students. Factor analyses were used to analyze the data. A principle components analysis, with a varimax rotation, yielded twelve factors: 1) Socialization, 2) Dominance, 3) Aesthetic Expression, 4) Body Cathexis, 5) Excellence, 6) Independence, 7) Stress-Reduction, 8) Esteem, 9) Thrill-Seeking, 10) Joy, 11) Aggression, and 12) Leadership. The factors accounted for 65% of the variance. The validated Model of Incentive Values in Physical Activity included twelve dimensions. The 700 respondents also rated their preferences for 48 physical activities. A factor analysis of activity preferences yielded ten factors: 1) Individual, 2) Rhythmic, 3) Nature, 4) Running, 5) Military Combat, 6) Water/Snow, 7) Martial Arts, 8) Team/Ball, 9) Racquet Sports, and 10) Team/Implement. The factors accounted for 31% of the variance. Multiple regression was performed to predict activity preference on the basis of incentive value scores. The largest R^2 was .30 on the Rhythmic Activities factor. A canonical correlation analysis was also performed. The largest R of the four significant canonical variates was .58. The study validated a Model of Incentive Values in Physical Activity. Further research is needed on the relationship between incentive values and preference and participation in physical activity.

The study was a doctoral dissertation conducted under the supervision of Dr. Ann E. Jewett, University of Georgia.

Linda M. Lander
Center for Educational Technology
University of Georgia, Athens, GA

Monday, April 11
3:15 - 3:30 p.m.

CHANGES IN COGNITIVE AND SOMATIC ANXIETY AS THE TIME TO COMPETE NEARS FOR ELITE GYMNASTS. Dan Smith, Rainer Martens, Damon Burton, Robin Vealey, Linda Bump, University of Illinois.

Past research using the old Competitive State Anxiety Inventory indicates that state anxiety increases as the time to compete nears Martens, 1977; Huddleston and Gill, 1981. Fenz and Epstein (1967) reported that state anxiety increased among novice -ky divers as jump time neared, but experienced jumpers showed a reduction in state anxiety during the final minutes before jumping. They hypothesized that experienced jumpers adopted cognitive coping strategies primarily to prepare themselves for the forthcoming jump. The present study investigated the changes in cognitive and somatic competitive state anxiety as competition neared among national team gymnasts, using the newly developed CSAI-2. In addition, the study was able to examine the changes in competitive state self confidence as time to compete neared. United States National Team Gymnasts participated in this study during the Sport Festival in Indianapolis (July, 1982). The first of four administrations of CSAI-2 was given to the gymnasts an average of four days before competition. The other three CSAI-2 responses were obtained 24 hours before the meet, two hours before, and 5 minutes before the start of the competition. The only significant change in anxiety over time on each of the three subscales was an increase in somatic anxiety from the baseline and the 24-hour before competition measure to the measure two hours and the measure five minutes before competition (univariate $F=8.57$, $p<.0001$). After taking into account the correlations between the dependent variables (cognitive, somatic, and self confidence) there was a significant change in the three subscales over time ($F=2.53$, $p<.01$). This change was almost totally due to the somatic subscale (discriminant function=V=.71 cognitive -1.12 somatic -.05 self-confidence. The strength of the somatic anxiety increase may mask the small changes in cognitive anxiety and self-con. idence. Research, without the three subscales, supporting an increase in competitive anxiety, immediately before competition, may accually be exhibiting an increase only in somatic anxiety. Athletes may have developed cognitive strategies to deal with worry. Strategies to decrease somatic anxiety may be more difficult. If indeed somatic anxiety accounts for a major portion of competition state anxiety, treatment strategies emphasizing somatic anxiety may be most appropriate.

Dan Smith
211 Freer Gym 906 S. Goodwin Avenue
Urbana, IL 61801-3895

Monday, April 11
3:30 - 3:45 p.m.

Assessment of Competitive Motivation in Female Age-Group Gymnasts.

Lynda E. Randall, San Diego State University.

The major objective of this study was to determine the reliability and validity of a modified version of the Youngblood and Suinn Motives for Competition scale, as adapted for use with youth sport participants between the ages of 10 and 16. Measures of validity included a judgmental check of content validity, a computation of criterion-related validity (correlation of motivational scores with subjective ratings of coaches), and a measure of construct validity (cluster analysis). The subject population utilized in testing the motivation instrument, revised in terms of level of readability, was delimited to 95 female gymnasts between the ages of 10 and 16. All subjects were members of club teams affiliated with the United States Gymnastic Federation competitive program in Massachusetts. The subjective ratings by coaches of the motivation of athletes to compete was accomplished through administration of a nine-item questionnaire. Computation of a Pearson product-moment correlation between scores obtained for the revised Motives for Competition scale and the Coaches' Subjective Rating Form yielded a coefficient of .025, indicating that the relationship was nonsignificant at the .05 level. However, analysis of the inter-item correlations resulting from cluster analysis led to the acceptance of the following clusters: (1) Competition and Success, (2) Social Facilitation, (3) Physical Development, (4) Recognition and Status, and (5) Personal Relationships. The alpha reliability coefficients attained for all of the five clusters were in excess of the established acceptability level of .60. Although the validity of the revised motivational scale was not supported, the resultant factors of motivation which were supported may be of consequence for further study. In addition, they may provide some valuable clues as to the nature of factors that comprise the overall motivation of athletes who compete in age-group gymnastics.

Dr. Lynda E. Randall
Department of Physical Education
San Diego State Univ.
San Diego, CA 92182-0171

Monday, April 11
3:45 - 4:00 p.m.

DIFFERENCES IN JOB SATISFACTION OF COACHES IN REVENUE AND NON-REVENUE SPORTS. Virden Evans, Joe P. Ramsey, Florida A&M University; Dewayne J. Johnson, Florida State University.

The purpose of this investigation was to determine if differences existed in the job satisfaction of collegiate coaches of traditional revenue and non-revenue sports. Additionally, differences by salary and position were analyzed. Data were collected on 513 coaches in 7 sports at 95 institutions in the southeast region of the United States. Subjects were asked to complete a personal data sheet and a 50-item job satisfaction questionnaire inquiring how they felt about their job. The results provided 13 sub-scores and a total job satisfaction score. The data were analyzed using ANOVA, factor analysis, and discriminant analysis on the factor scores. Differences were found by salary on 8 of the 13 sub-scores and on the total score while differences by sport (revenue and non-revenue) were found on 4 of the sub-scores. Factor analysis identified 3 factors with the first factor accounting for 78% of the variation in the job satisfaction scores. Discriminant analysis was used to identify which of these factors could be used to distinguish between coaches of revenue and non-revenue sports. It was determined that 2 of the 3 factors would distinguish between coaches of the different sports. Results suggest that intrinsic variables related to the coaches' ability to achieve self-fulfillment within their sport are the variables that determine differences in the job satisfaction scores of coaches in revenue and non-revenue sports.

Virden Evans
Florida A&M University
Tallahassee, FL 32301

Monday, April 11
4:00 - 4:15 p.m.

RELATIONSHIPS OF INTRINSIC AND EXTRINSIC COMPONENTS OF JOB SATISFACTION, AMOUNT OF TIME SPENT ON THE JOB, AND BURNOUT OF COLLEGIATE COACHES. Dewayne J. Johnson, Florida State University; Joe P. Ramsey, Virden Evans, Florida A&M University.

The purpose of this investigation was to determine what the relationship was between the intrinsic and extrinsic components, total job satisfaction, and the amount of time spent on the job. Differences between intrinsic and extrinsic variables were also determined using 4 independent variables (hours per week, years coaching, years in present position, type of assignment). Data were collected on 513 coaches at 95 institutions in the southeast region of the United States. Subjects were asked to complete a job satisfaction questionnaire that contained a personal data sheet on 50 questions related to their job. The results provided 13 sub-scores and a total job satisfaction score. The data were analyzed using Pearson product-moment and ANOVA. Intrinsic and extrinsic variables of job satisfaction were significantly related ($r=.75$) but were significantly different with the coaches' satisfaction with intrinsic variables significantly lower than their satisfaction with extrinsic variables. Significant differences were also found for extrinsic and intrinsic variables by years coaching experience but job satisfaction did not decrease with longevity. Significant differences were also found for both intrinsic and extrinsic variables when analyzed by number of hours spent on the job. However, no trend was indicated by these differences. Dual role coaches, those who had assignments other than coaching, had significantly lower satisfaction scores for both intrinsic and extrinsic components. The results suggest that the long term cumulative affect of the stress of coaching does not negatively affect coaches' job satisfaction of those who continue in the profession to the degree that burnout would be expected.

Dewayne J. Johnson
Florida State University
Tallahassee, FL 32306

Monday, April 11
4:15 - 4:30 p.m.

DIFFERENCES IN INTRINSIC AND EXTRINSIC COMPONENTS OF JOB SATISFACTION OF MALE AND FEMALE ATHLETIC DIRECTORS. Robert A. Oliver, University of Northern Colorado; Dewayne J. Johnson, Florida State University.

The purpose of this investigation was to determine if differences existed between the intrinsic and extrinsic components of job satisfaction for athletic directors at the collegiate level. Also, data were analyzed by the sex of the directors. A 50-item job satisfaction questionnaire was administered to 50 male (n=25) and female (n=25) athletic directors. The instrument was constructed and scored following the summative model with a Likert scale from 1-5. The instrument provided 12 sub-scores, a total score, and a sub-score for the intrinsic component and a sub-score for the extrinsic component. Data were analyzed using Pearson product-moment, ANOVA, and stepwise multiple regression. Significant correlations were found between intrinsic, extrinsic, and total job satisfaction scores. Female athletic directors had significantly lower scores on both the intrinsic and extrinsic component as well as the total job satisfaction component. Multiple regression provided two completely separate sets of variables that explained the variation in the total job satisfaction scores and slightly different variables between males and females that accounted for the variation in the intrinsic and extrinsic components. Results suggest that the females' job satisfactions were affected to a greater degree by intrinsic variables, such as self-fulfillment, self initiative, and involvement, than were the males' job satisfaction scores.

Robert A. Oliver
University of Northern Colorado
Greeley, CO 80639

Monday, April 11
4:30 - 4:45 p.m.

SENSATION SEEKING AMONG HIGH AND LOW-RISK MALE ATHLETES. William F. Straub, Ithaca College, Ithaca, New York

There are many problems associated with the measurement of athletes in contemporary sport psychology. There are, for example, a dearth of valid and reliable tests to assess the many and diverse behaviors of players. The purpose of this investigation was to attempt to validate Zuckerman's sensation seeking scale (SSS V) using high- and low-risk sport participants. The SSS (Form V) was administered to male hang gliders (n = 33), automobile racers (n = 22), and intercollegiate bowlers (n = 25). It was hypothesized that the high-risk athletes (hang gliders and auto racers) would score significantly higher (.05 level) than the low-risk sport participants (bowlers) in total sensation seeking score and on the four subscales of Zuckerman's test. Stepwise multiple discriminant function analyses found that except for thrill and adventure seeking and disinhibition subscales, the above hypotheses were tenable. Thus, it was concluded that there is support for Zuckerman's SSS (Form V) as a measure of sensation seeking among male athletes.

William F. Straub
Department of Physical Education
Ithaca College
Ithaca, NY 14850

Monday, April 11
4:45 - 5:00 p.m.

A FIRST LOOK AT THE FACTOR STRUCTURE OF THE MODEL FOR MOVEMENT CONFIDENCE. Norma S. Griffin, University of Nebraska-Lincoln; Jack Keogh, UCLA; Richard Maybee, Guilford College.

The purpose of this research was to test the hypothesis within the model for movement confidence which suggested that elements described as MOVCOMP(competence) and MOVSENSE(interaction of potential for enjoying moving sensations and potential for harm) were separable, identifiable and interacted to produce a level of movement confidence (MC). The interaction was predicted to be $C + (MS_E - MS_H) = MC$.

A Movement Confidence Inventory was developed and utilized to collect data. The inventory presented a description of twelve tasks and included three different ratings for each task. (1) level of experience, (2) a confidence rating in performing the task and (3) a rating of 44 descriptor words (treated as 44 variables) as to their contribution to the confidence of the subject in performing the task. The descriptor words were "a priori" predicted to load on one or more of the three main elements in the model.

Subjects were 356 college-age students from four institutions. Factor analysis (Principle Factoring with iteration) was applied for maximum sensitivity to factor structure. Varimax rotation was applied to the factor matrix to simplify the factor structure. A stingent criterion level of 60-40 was applied, calling for an item loading of .60 or higher on any one factor with a loading no higher than .40 on any other factor.

Across task analyses revealed clustering of descriptors which had been a priori loaded on the elements of competence, potential for enjoying and potential for harm. Descriptors related to perceptions of task difficulty and personal competence in performing the task dominated the factor structure and tended to appear in large "clumps" in the first two factors. Clusters of descriptors which were a priori loaded for the MOVSENSE element appeared in the factor structure across tasks but were generally found in the third and fourth factors.

Results of this study suggest a configuration of factor structure which was predicted in the model for movement confidence and also confirm the need for additional study in order to identify the structure and its influence more precisely.

Norma Sue Griffin
School of HPER
University of Nebraska-Lincoln
Lincoln, NE 68588-0143

Monday, April 11
5:00 - 5:15 p.m.

THE INFLUENCE OF "EASY" AS A TASK DESCRIPTOR ON SELF-REPORT RATINGS OF MOVEMENT CONFIDENCE. Jack, F. Keogh, UCLA; Norma S. Griffin, University of Nebraska-Lincoln.

The purpose of this investigation was to determine the influence of performer perceptions of the difficulty of a task in relation to personal competence on the self-reported confidence in performing the task. This study is one of a series of studies exploring the predicted interaction of MOVCOMP and MOVSENSE elements in the model for movement confidence. In the model, perceptions of task difficulty are predicted to interact with perceptions of skill/ability to produce a sense of Competence (MOVCOMP) in relation to task demands.

Subjects were 356 college-age students from four institutions. Data were collected using a Movement Confidence Inventory. Ratings were obtained for (1) level of experience with each of 12 tasks, (2) self-reported confidence in performing each task and (3) a rating of 44 descriptor words (variables) as to the contribution of each to the overall confidence in performing the task.

In the regression analyses, confidence rating was the dependent variable and the experience rating and the 44 descriptor words were the independent variables. The word "easy" as a descriptor of the perceived difficulty of the task to be performed was the only variable to appear in regression equations for all tasks in the inventory. Obtained R squared for "easy" ranged from .5101 for a tumbling task to .0063 for a parachuting task. For the tumbling task where easy explained 51% of the variance, experience with the task explained another 6% of the total variance and no other variable added more than an additional 2.5% to the total variance accounted for in the equation. In contrast, "easy" as a task descriptor accounted for less than 1% of the variance in explaining the confidence in performing the parachuting task and the word "pleasurable" with R squared of .2545 explained the greatest amount of variance.

Results of this study indicated that the task analyses of the performers did include a perception of the difficulty of a task in relation to personal competence as represented by the term "easy" and that this perception was an important influence on the self-reported confidence of the performer in performing the task. Findings also suggested that there are other influences which are important in producing personal levels of movement confidence such as perceptions of potential for enjoying moving sensations (MOVSENSE).

Jack F. Koegh
Department of Kinesiology
UCLA
Los Angeles, CA 90024

Monday, April 11
5:15 - 5:30 p.m.